ELECTRICAL WEST

September 1949
25 Cents

Annual Lighting Issue

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

You save from 20% to 60% on food purchases
with a Home Freezer
You save from 3¢ to $1.50 per week on transportation
with a Home Freezer
You save from 3% to 5% on your food budget
with a Home Freezer
You save 2 to 5 hours per week
with a Home Freezer

What's the Good word?

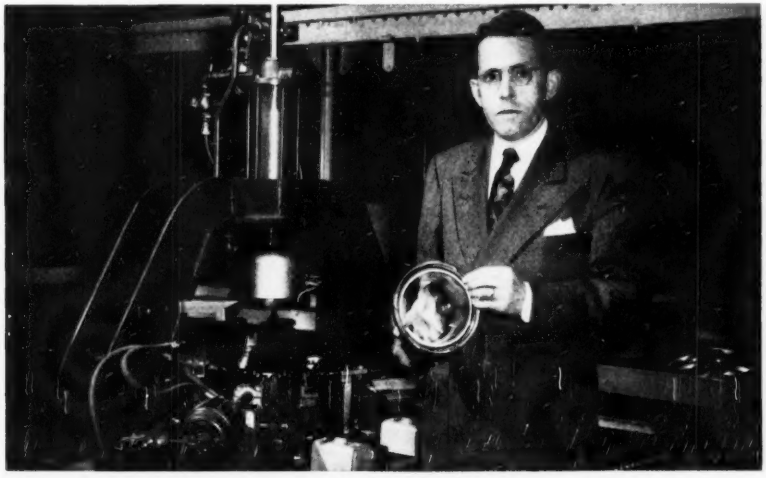
These days, a different subject keeps popping up in conversations between appliance dealers and customers. It isn't a new word—it has just been away for a while. And there's no reason why most of us shouldn't welcome it back.

It wasn't really healthy for the appliance business that the thing which brought sales to a close was the magic word "available." Using scarcity as a substitute for value is not good business. We look forward with optimism to some sounder selling, now that the word "save" has returned.

That's a good word—"save!" Customers like it. That is why it's the word which shouts loudest in these Edison advertisements which are helping to make freezer sales for dealers in Central and Southern California. As always, Edison advertising is in tune with the times and the market.

Edison *Southern California Edison Company*

— how you are assured —
— lower maintenance costs with —
— **new** watthour meter, type I-50 —



This 3-head welding machine is one of the many pieces of equipment designed especially for I-50 production. It automatically welds clips to cover rings. This is a small operation, but it's typical of many such operations that all contribute to the accuracy and uniformity of the I-50.

When we assure you of lower maintenance costs with the I-50 meter, we give you our personal *assurance. This comes directly from the people here who build I-50 meters.*

We're proud of the outstanding engineering design behind new features like the magnetic suspension of the rotating element. But we realize that these new features can only be as good as we make them.

So, we employ only specially trained personnel. We have provided them with the best and newest in manufacturing facilities. And, we have in operation a system of rigid quality control.

All this is backed by strong enthusiasm on the part of individual employees—a determination to make the best watthour meter General Electric has ever built.

L P Hannaway

Plant Manager
Somersworth, N. H.

Type I-50, the first completely new watthour meter in 50 years

Order now from your nearest G-E representative. I-50 meters are available in socket- or bottom-connected types with pointer or cyclometer register. *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

Exclusive Features for Lower Maintenance

1. Co-ordinated insulation—for better performance under adverse conditions.
2. Magnetically suspended rotating element—to do away with bearing maintenance.
3. Braking magnets die-cast in frame—to assure calibration stability.
4. Current coil molded in butyl and potential coil in polyethylene—for greater insulation and stability.
5. One-piece molded "S" base—to minimize corrosion

GENERAL ELECTRIC

901-22

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

SEPTEMBER
1949

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S.
The all-industry magazine of progress, established 1887, and incorporating the "Electrical Journal," "Journal of Electricity, Power and Gas" and "Journal of Electricity." Contents copyright. Sixty-second year of publication

ELECTRICAL WEST

James H. McGraw (1860-1948), Founder
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Peggy Boyer, Assistant Editor — R. A. Balzari, Publishing Counselor
John W. Otterson, Manager — John Cootz, Typography

INDUSTRIAL PROGRESS

Western industrial developments will be main theme of the October annual industrial issue of Electrical West. This year there will be several articles dealing with new Western industrial plants. These will include the new phosphate plant at Pocatello, Idaho, the Carborundum plant at Vancouver, Wash., the plant of the Revere Copper & Brass Co., at Los Angeles, and the McCulloch Motors plant, also in Los Angeles.

Other features will be a statistical report on Western industry, a survey of Western coal reserves and an article on electronic gluing in the lumber industry. A picture-story on a new motor works will show modern facilities for serving industry.

Besides industrial treatment, there will be a leading article by W. C. Mullendore, president of Southern California Edison Co., on the Social and Economic Responsibilities of the Engineer. For utility engineers there will be another installment on preventive maintenance and a piece on fuse coordination on primary feeders. The issue also will carry reports on meetings of the Pacific Coast AIEE, Rocky Mountain Electrical League, Northwest Public Power Assn., and a contractors meeting in the Northwest.

Featured in new prdoucts will be a 115-kv. air-break load interrupter switch for pole mounting. Look for the news letter, too.

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COVER PHOTO: One of the more than 1,700 classrooms in all of Denver's 76 schools that are now relighted and redecorated in the city's complete program (see page 67).

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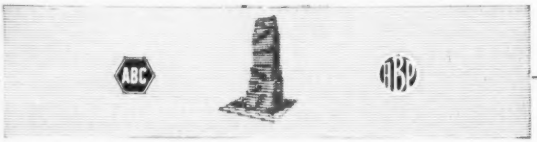

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Can the cutout take it? Research Engineer and oscillograph watch to see what happens when a 6000 amp 15,000 volt fault current hits. At right: it happens! The fuse blows; the cutout is undamaged.

look what happens in L-M's new "KNOW-HOUSE"

A siren shrieks. L-M Research Engineer Blaine Schultz opens the oscillograph shutter. "BANG!" 6000 amps just blew a fuse in L-M's HXO cutout!

Another test has been recorded in L-M's "Know-House," the big new short circuit testing laboratory in South Milwaukee.

It takes a lot of equipment to make such tests possible. For instance, there is the world's largest high speed short circuit test generator. It provides over 500,000 kva—enough to light a city of half a million momentarily! Over 75,000 amps symmetrical at 4330 volts; up to 15,000 volts 3-phase, 69,000 single-phase.

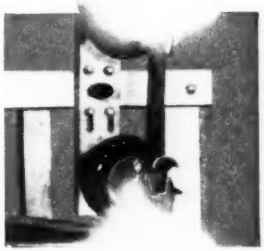
That big generator sits solidly on a million pounds of concrete. Its 14-ton rotor, driven at 3600 RPM, would coast for half an hour except for dynamic braking which brings it to a smooth stop in four minutes.

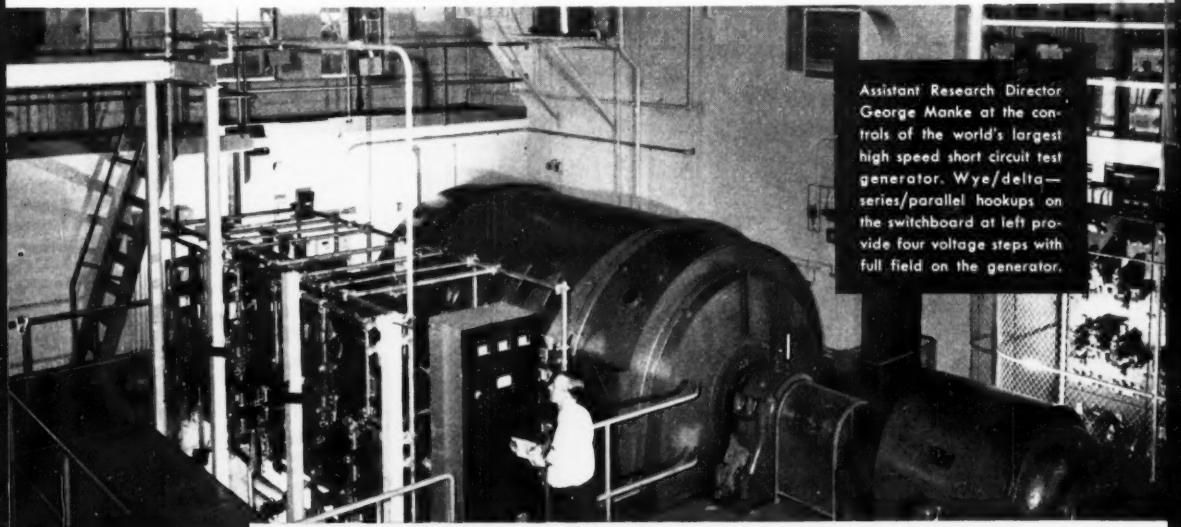
There's a variety of automatic and manual controls. A synchronous switch closes the circuit at any desired point of the 60-cycle wave. A 1,500,000 kva air blast breaker provides back-up protection.

In the control room is an auditorium which permits observers to see the tests and watch the operation of the extensive control and recording equipment. Test cells include one with 12-inch concrete walls and bullet-proof windows for explosive tests.

Much of the equipment is underground, including the oil circulating system, ducts providing 45,000 cfm of filtered air, and the tremendous generator bed.

L-M is one of only four companies in the country with such a laboratory. This means that in addition to its other extensive research laboratories and staff, L-M provides more facilities to assure L-M customers of conservatively rated, *completely tested and coordinated distribution equipment*, more facilities to meet the demand for equipment able to handle the heavier loads of today—and tomorrow.





Assistant Research Director, George Manke at the controls of the world's largest high speed short circuit test generator. Wye/delta—series/parallel hookups on the switchboard at left provide four voltage steps with full field on the generator.

LM

LINE MATERIAL... Research

Completely *Tested* and Coordinated Distribution Equipment

Now Ready!!!

NEWEST TIME-

AND AWAITING YOUR REQUEST...

NEW ENGINEERING DATA...
NEW APPLICATION "POINTERS"...

ADDED SPEEDS . . . NEW "ALL-IN-ONE" PACKAGE PRESENTATION — These comprise another outstanding engineering service offered by S&C to satisfy an industry-wide desire for better power fusing information.

Packaged in convenient, indexed, folders punched for insertion in a loose-leaf binder, filed in a visible arrangement that protects and yet permits rapid selection of each sheet, and separated by product line, a total of 58 time-current curve sheets are offered providing the following information:

1. NEW TOTAL-CLEARING, Minimum-Melting, and Short-Time Rating Curves, accurately drawn on fine scale NEMA grids, identified by color, and printed on transparent paper, ideal for tracing and reproduction, or light-table comparisons.

2. REFUTATION of the notion that short-time curves or "set-back" allowances are essential in the coordination of *all* fuses—such allowances being unnecessary with "non-damageable" fusible elements, obtainable only in S&C fuses.

3. FUSIBLE ELEMENT CONSTRUCTION DESIGNATED, with its effect upon "non-damageability" and accuracy stated.

4. EFFECT OF "PRE-LOADING", and ambient temperature variations.

5. ADDED SPEEDS—Standard, Slow and Time-Lag Characteristics with average speed ratios—between the 0.1-second melting current and the 300-second melting current—of 7 to 1, 10 to 1 and 13 to 1, respectively.

6. HIGHER AMPERE RATINGS.

For your *free* Time-Current Characteristic Folders pictured on the opposite page please write, on your business letterhead, TODAY!!!

The growing need for, and increasing importance of, this more detailed, more accurate, fuse coordination data was created by the

NEW CONCEPT OF PRIMARY FUSING

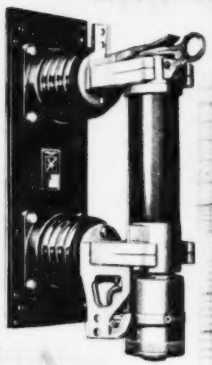
namely, *Full Coverage*, in which a primary fuse is applied for *both* primary short circuit and secondary backup short circuit protection.

This practice requires a "non-damageable" fusible element, dependable low-fault-current interrupting ability, ability to function dependably under conditions of severe recovery voltage, and a fine degree of accuracy in time-current characteristics—a combination of qualities found only in S&C fuses.

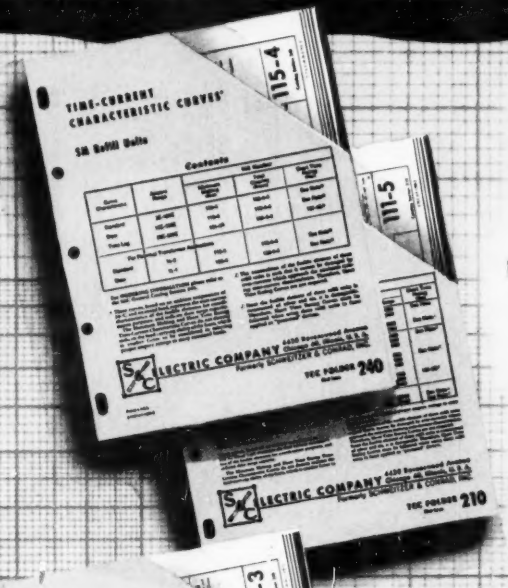
S&C ELECTRIC

Harold J. Randolph, Los Angeles

CURRENT INFORMATION FOR POWER FUSING

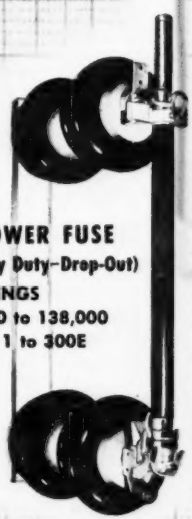


SM POWER FUSE
(Boric Acid—Heavy Duty)
RATINGS
Volts: 7500 to 34,500
Amperes: ½ to 800E



LIQUID POWER FUSE
RATINGS
Volts: 7500 to 138,000
Amperes: ½ to 250E

HSO POWER FUSE
(Boric Acid—Drop-Out)
RATINGS
Volts: 7500 to 69,000
Amperes: 1 to 200E

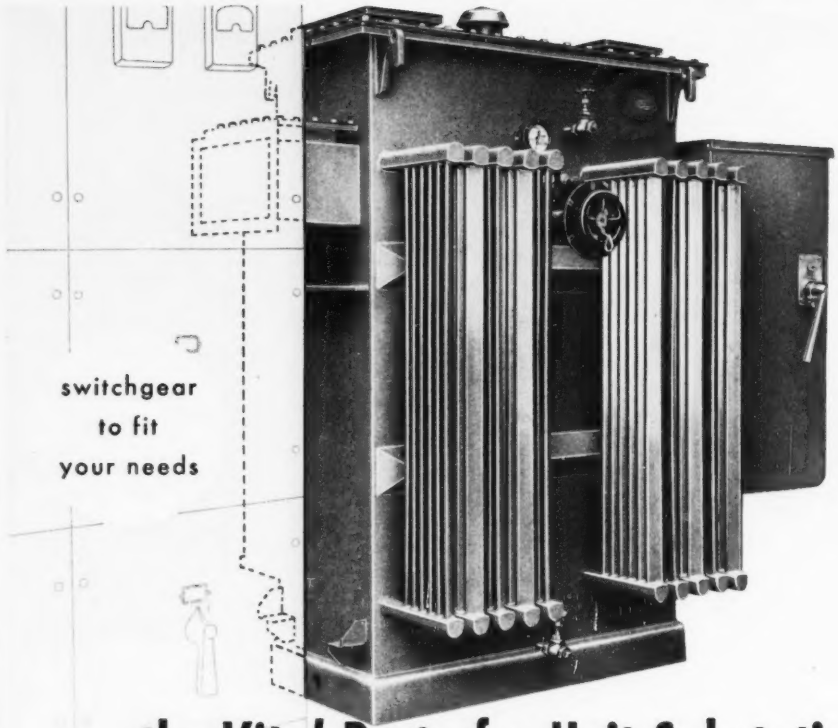


SMD-2 POWER FUSE
(Boric Acid-Heavy Duty-Drop-Out)
RATINGS
Volts: 34,500 to 138,000
Amperes: 1 to 300E

S&C ELECTRIC COMPANY 4425 Ravenswood Avenue
Chicago 40, Illinois, U. S. A.

Formerly SCHWEITZER & CONRAD, INC.

Geo. E. Honn Co., San Francisco; Chas. E. Klaus, Portland; Thomas S. Wood, Seattle



the *Vital* Part of a Unit Substation is the Transformer

• Wagner Unit Substation Transformers can be Throat Connected to any make of Switchgear. The transformer is the vital part—the fuel pump—of a load center distribution system. If the transformer fails, the entire system is dead, whereas only part of the distribution system may be affected by the failure of a switch or circuit breaker.

You can be sure of a dependable continuous flow of power from a Wagner transformer and you can be sure that it has been carefully designed to meet your distribution requirements.

Wagner unit substation transformers with incoming high voltage switch sections to meet your requirements, and, with proper throats on the secondary side for connection to any make of switch-gear, are available in the usual range of ratings up to 2000 kva. Our factory-trained sales engineers are well qualified to recommend the various combinations necessary to handle your unit substation requirements and will gladly give you immediate service.

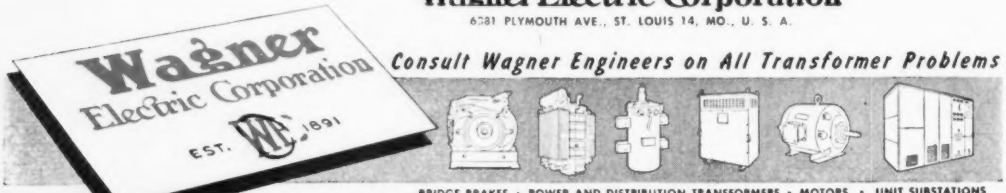
Wagner unit substation transformers are installed in numerous electric generating stations and in all kinds of industrial plants including synthetic rubber, petroleum, steel, chemical, aircraft, automotive, paper, and many others. The importance of the transformer in a unit substation justifies calling in the Wagner sales engineer to help solve all your load center problems.

Our free bulletins TU-13 and TU-56 describe the design and construction features that make Wagner liquid-filled and dry-type unit substation transformers outstanding.

Wagner Electric Corporation

6381 PLYMOUTH AVE., ST. LOUIS 14, MO., U. S. A.

Consult Wagner Engineers on All Transformer Problems



BRIDGE BRAKES • POWER AND DISTRIBUTION TRANSFORMERS • MOTORS • UNIT SUBSTATIONS

ELECTRICAL EQUIPMENT AND AUTOMOTIVE BRAKE PRODUCTS

T-49-11

Get your Free INDENTER

Cross Section Showing Indentations.

Here is your chance to get a free Briegel Indenter — the tool that saves more time installing thin wall tubing than anything else on the market. This Special Package Offer is made up of 400 1/2" Briegel Connectors and 200 1/2" Briegel Couplings — enough to wire three average six room houses — and One Original Briegel Indenter all for the price of the fittings alone.

The Briegel Method of installing thin wall is not only faster and less expensive but also neater in appearance and more permanent.

Cash in on this free offer while it lasts. Save time and save money on your original purchase and on the job with Briegel Fittings!

This offer available at all leading wholesalers.

All B-M Fittings Carry the Underwriters' Seal of Approval

This offer subject to withdrawal without notice

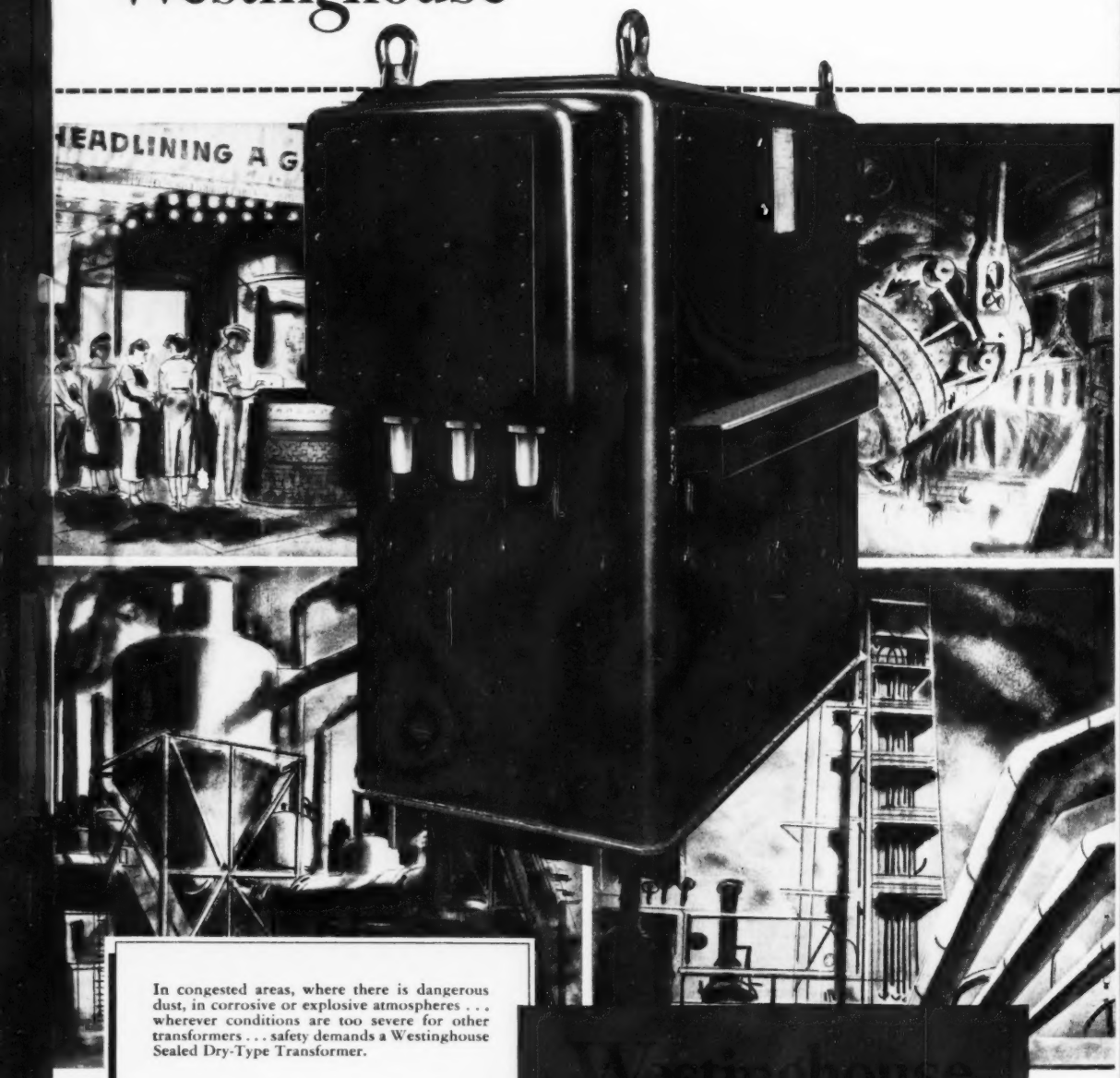
Insist on Briegel All-Steel Approved Couplings and Connectors. These are the Original Labor-Saving Indenter Type fittings used by contractors for over 15 years.

BRIEGEL METHOD TOOL CO.

GALVA • ILLINOIS

YOU CAN BE **SURE**.. IF IT'S

Westinghouse



In congested areas, where there is dangerous dust, in corrosive or explosive atmospheres . . . wherever conditions are too severe for other transformers . . . safety demands a Westinghouse Sealed Dry-Type Transformer.

Westinghouse

SEALED DRY-TYPE TRANSFORMERS

Safest Transformer Ever Built and it *Saves Money*, too!

Safe against fire and explosion hazards! Safe against submersion or hazardous dusts.

The Westinghouse Sealed Dry-Type Transformer is constructed with Class H insulation. Insulating materials consist of glass tubes and barriers, porcelain spacers, Fiberglas* and silicone varnish . . . in an atmosphere of dry nitrogen.

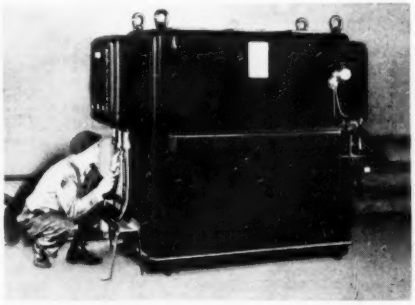
It Saves Money Three Ways

1. **No Vault to Build.** Because of its safety features, the Westinghouse Sealed Dry-Type Transformer may be installed anywhere without a vault or protective barriers. Reduces installation costs; minimizes maintenance time.
2. **No Liquids.** No storing, testing, filtering or reconditioning. No seepage or smudge.
3. **No Accessories for Liquids.** Devices such as valves, cooling units and gauges are eliminated, effecting economy in space and maintenance, improving appearance.

*T. M. Reg. O-C-F Corp.

For complete reliability, economy and cleanliness—*greater safety at greater savings*—install Westinghouse Sealed Dry-Type Transformers. Get an unbiased recommendation from the man who sells all types of transformers, your Westinghouse representative. Or write Westinghouse Electric Corp., Transformer Division, Sharon, Pa.

J-70546



A recent sealed dry-type installation of a network transformer in the basement of a large theatre in Pittsburgh. Westinghouse's first Sealed Dry-Type Transformer has been in successful operation since 1943 in New York City.

21 YEARS OF PROOF

Section of Okoloy-coated wire removed for examination after 13 years of service along railroad right of way, under continuous exposure to weather and highly corrosive sulphur fumes. Note perfect condition of Okoloy coating and Okonite insulation.

OKOLOY
COATINGS FOR CONDUCTORS

Outlast "TINNING" 2 to 1

. . . another reason why Okonite quality gives true cable economy!

TWENTY-ONE YEARS of repeated proof in severest service have borne out the original findings of Okonite research chemists—*that Okoloy coatings for copper conductors outlast "tinning" at least two to one.* Test after test shows that this quality feature adds years to the useful life of Okonite wires and cables.

The Okoloy process was introduced in 1928 to offset two factors frequently encountered in tin conductor-coatings which lessen long cable life—1) tin coatings readily alloy with copper in the processing bath and, as a result, some copper always remains in contact with the rubber insulation; and 2) the sulphur contained in the rubber compounds then reacts with and destroys the tin-copper coating which in turn exposes the copper conductor, eventually causing deterioration of the rubber insulation.

Okoloy affords protection against both these factors because it is a lead alloy. Of all common metals, lead is least damaged by sulphur acids. What's more, lead does not alloy with copper under the conditions encountered in coating conductors. Because processing baths are not contaminated with copper, the Okoloy coating is pure throughout. It adheres strongly to the copper conductor, and surrounds it with an acid-resistant, flexible coating which contributes materially to longer life of both rubber insulation and conductor.

Okoloy is just one of the "longer-life" features built into Okonite products—features that give true wire and cable economy, especially in these days of high installation costs. To get complete details on how Okonite can meet your needs, we suggest that you call in an Okonite engineer, or write to The Okonite Company, Passaic, N. J.

THE BEST CABLE IS YOUR BEST POLICY

OKONITE OKONITE SINCE 1878 *insulated wires and cables*

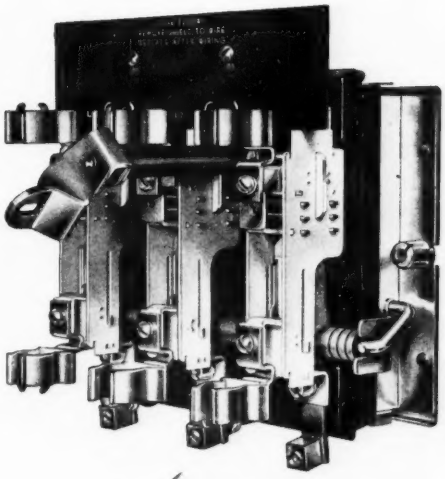
7593

NOW... an ALL-NEW Type A Safety Switch for modern high-capacity distribution systems...

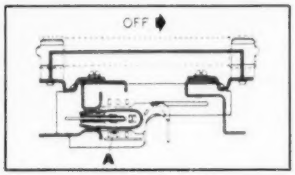
TRUMBULL'S HCI

HIGH CAPACITY INTERRUPTER

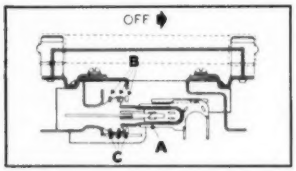
Unusually high interrupting capacity..."circuit-breaker" action breaks heavy loads quickly, safely. Extremely high momentary current capacity . . . withstands heavy short circuits without damage. 30-, 60-, 100-ampere sizes.



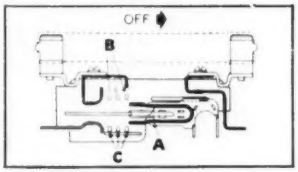
Here's How...
HCI's "Circuit-Breaker" Action Works



1. Switch closed. Spring-loaded sliding contact (A) fully inserted between stationary contacts. Red indicates current.



2. Sliding contact being withdrawn. The two arcs repel each other, are drawn against grid pins (B) and (C), which break and cool them.



3. Contact fully withdrawn. Trumbull's unique "Circuit-Breaker" action has effectively extinguished the arcs.

CHECK THESE ADDITIONAL SPACE-SAVING, TROUBLE-PREVENTING, LIFE-LENGTHENING FEATURES

Center-front operation permits close ganging.

Front fusing allows compact box, yet gives ample wiring space.

No exposed live parts when switch is OFF and door is open.

Handle interlock.

Clear ON and OFF markings both inside and outside.

No dead center—roller-cam action (multiplying linkage design with powerful spring) throws switch to full OFF and ON.

Poles are self-contained switching units for easy replacement.

Silver-plated current-carrying parts prevent oxidation . . . give low-resistance contact.

Insulating parts made of linen melamene, light, strong, arc-resisting.

Enclosed operating mechanism (on 60- and 100-amp. sizes) prevents wire chafing.

Interior removable for wiring ease.

Underwriters' approval throughout.

For more information about Trumbull's all-new HCI Safety Switch, write for your free copy of Bulletin TEC-10 today. THE TRUMBULL ELECTRIC MANUFACTURING COMPANY, Plainville, Connecticut.

Men Who Observe the Best Electrical Practice Make It a Practice to Use

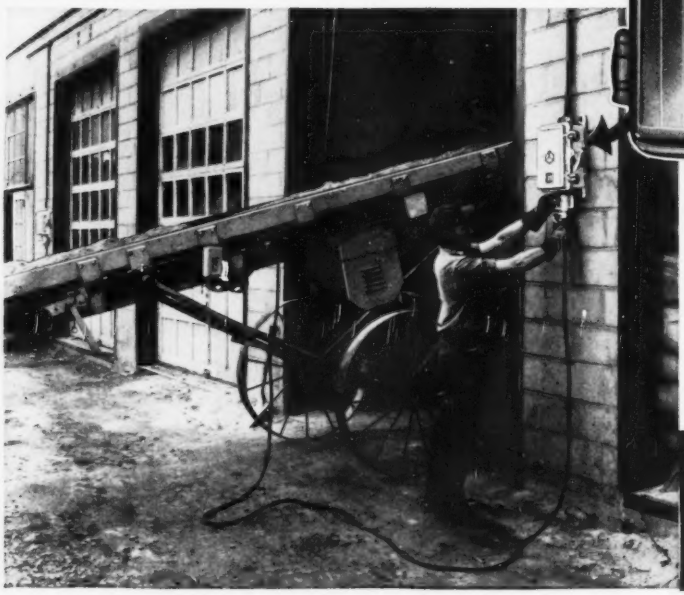
TRUMBULL (T) ELECTRIC

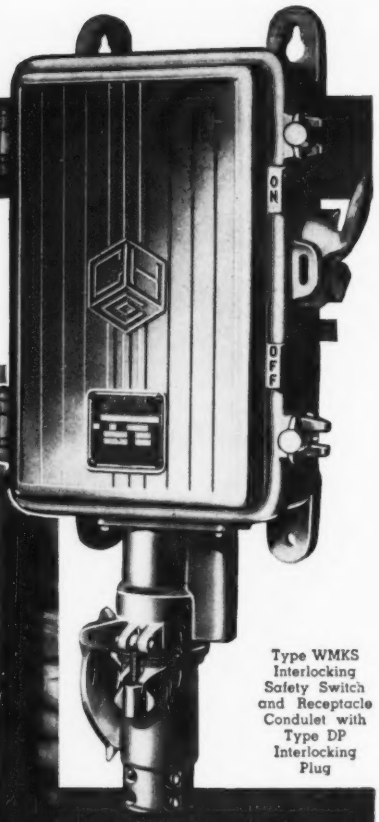
TRUMBULL'S TRAINLOAD OF NEW PRODUCTS

Type WMKS **Interlocking** Safety Switch and Plug Receptacle

CONDULET*

for the control of all kinds of
portable electrical equipment
in both indoor and outdoor locations





Type WMKS Interlocking Safety Switch and Receptacle Conduiet with Type DP Interlocking Plug

It's heavy duty!
It's raintight!

Safety. Positive interlock prevents opening the case or withdrawing the plug unless the switch is "off". Switch can't be turned "on" unless the case is closed and the plug fully inserted.

Switches. Motor circuit switch. Quick make and break. Double break, reinforced, positive pressure-type blade and jaw construction. Positive pressure fuse clips. Combination solder or solderless wire lugs. 2 or 3-pole fusible.

Plug Receptacles. Style 1 is grounded through the shell of the plug and the receptacle housing. It will take the plugs used with the former Type MKS of the same rating. Style 2 is grounded through an extra pole and the shell. An eyebolt and wingnut prevents accidental withdrawal of the plug when the switch is open.

Cast metal case. Strong and durable. Four sturdy mounting feet. Many possible threaded hub arrangements for both vertical and horizontal conduit. Cover may be padlocked to prevent unauthorized entry. Operating handle may be padlocked "on" or "off".

Threaded operating shaft. Bearings permanently lubricated to resist corrosion and prevent the entrance of dust and moisture.

Horse-power ratings. 2 through 50 H. P. 30, 60, 100 or 200-ampere. 230 or 575-volt A. C.

Listed in Condulet Catalog 2500, Section 50.

*CONDULET is a coined word registered in the U. S. Patent Office. It designates a product made only by the Crouse-Hinds Company.

A Nationwide Distribution Through Electrical Wholesalers

CONDULETS
FLOODLIGHTS
TRAFFIC SIGNALS
AIRPORT LIGHTING

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Syracuse 1, N. Y.

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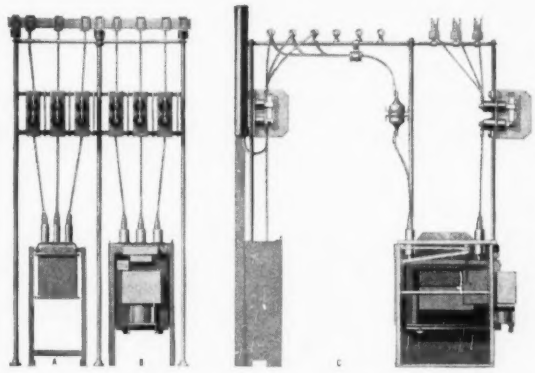
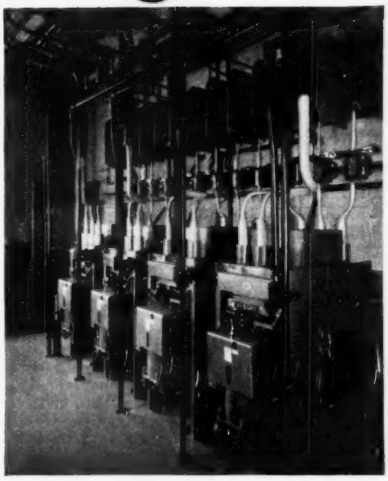
CROUSE HINDS COMPANY OF CANADA, LTD., *Main Office and Plant:* TORONTO, ONT.

How to Put NEW LIFE Into Old Switchgear



You salvage everything but the obsolete breaker when you install *Ruptair* Replacement Unit. New current transformers, disconnect switches, or buses are seldom necessary.
A. Typical open-type iron pipe framework with oil circuit breaker.
B. New *Ruptair* unit replaces obsolete breaker.
C. Side view of new unit.



Installation of *Ruptair* Replacement Units, rated 5 kv, 150 mva, in midwestern utility substation.

Replace Obsolete, Worn out, Low Capacity Oil Breakers With Modern *Ruptair* Circuit Breakers!

HERE'S A MODERN WAY to improve circuit protection, reduce breaker maintenance and modernize inadequate facilities.

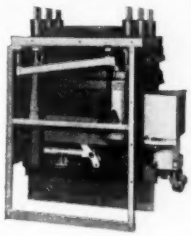
The *Ruptair* Vertical-lift circuit breaker is oilless, reduces fire hazard, requires little maintenance. It is engineered for quick withdrawal. Integral wheels make it easy to move breaker and permit inspection and maintenance at a test station remote from switchgear.

The unit is quickly installed in existing concrete or masonry cells, or in open-type iron pipe framework. Low height makes it applicable to small existing structures.

Vertical-lift design simplifies connection of bushings to existing bus or cable with minimum cost and material.

Voltage ratings 2300 and 4160 volts, interrupting capacities 100, 150 and 250 mva, current capacities 1200 and 2000 amperes, either a-c or d-c solenoid operation.

Call your nearby A-C sales office or write direct for Bulletin18B7094.



Ruptair Replacement Unit with side sheet removed showing circuit breaker in operating position.

Ruptair is an Allis-Chalmers trademark.

ALLIS-CHALMERS
First in the U. S. with Metal-Clad Switchgear

ALLIS-CHALMERS, 939A SO. 70 ST.
MILWAUKEE, WIS.

Please send new bulletin 18B7094 on *Ruptair* replacement unit.

Name _____

Title _____

Company _____

Address _____

City _____ State _____

A-2784

KYLE automatic oil circuit RECLOSERS for precise coordination . . .

Kyle reclosers offer complete protection for lines, and safety for linemen. They are the original, and still the best, automatic protection for both single and three-phase lines. They offer flexibility to meet all conditions, and precise coordination with fuses, sectionalizers, other reclosers, and station breakers. They avoid lockouts and outages, cut maintenance, and protect your equipment and service.

Outstanding Kyle Recloser Features

Three reclosures before locking out; choice of four opening sequences . . . Coils and sequences easily changed in the field . . . Trip-free operating handle. Tank and cover are dead; bushing terminals are the only live parts . . . Positive dependable operation—no motors or clockwork . . . Large cast aluminum cover; sleet hood protects operating handle and counter . . . Ratings 5 to 50 amps.; 2400 to 15,000 volts; minimum tripping current 10 to 100 amps.; interrupting capacity 150 to 1200 amps.

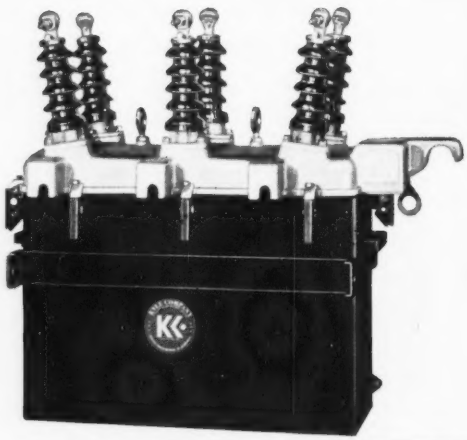
. . . ON SINGLE-PHASE . . . AND THREE-PHASE LINES

◄ KYLE
TYPE H
Single-phase recloser

Protects feeders and branch lines on both single- and three-phase systems by coordinating with fuse links, sectionalizers, and other reclosers. Isolates permanent faults to small parts of a system and thus cuts amount of patrolling required.

KYLE ►
TYPE 3H
Three-phase recloser

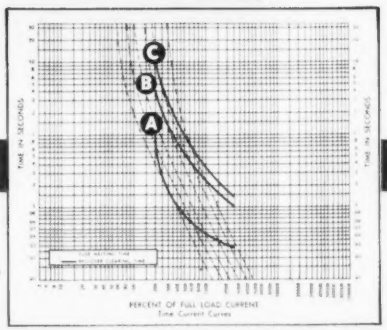
A practical combination of single-pole units so as to permit single-phase operation of any of the three-phase units so long as no lockout is required. If any one unit locks out, the other two lock out simultaneously. Prevents "single phasing" and overloading and burning out 3-phase motors. 7119



CHOICE OF 4 OPENING SEQUENCES

Curves show recloser action on each sequence:

1. Curve A—four fast openings.
2. Curves A and B—two fast, two retarded openings.
3. Curve C—four extra retarded.
4. Curves A and C—two fast and two extra retarded.



LM KK

For complete information ask the L-M Field Engineer or write **KYLE COMPANY** division of Line Material Company Box 2077, Milwaukee 1, Wisconsin

LINE MATERIAL Kyle Reclosers

7119

Complete Coordinated Equipment for All Distribution Requirements

KYLE TYPE GS AUTOMATIC OIL SECTIONALIZER

Isolates permanent faults on branch lines of recloser-protected systems

Kyle automatic oil sectionalizers provide dependable automatic protection against permanent faults on branch lines. They do not open on temporary faults, but operate to disconnect the branch only after one, two, or three operations of the back-up recloser have failed to clear the fault. After the third recloser operation, the contacts of the sectionalizer open up while the recloser is open. Thus the faulted branch is disconnected, and the recloser resets itself and maintains service on the rest of the system.

The sectionalizer may be set to open on a permanent fault after one, two, or three operations of the recloser, as desired. Since the sectionalizer does not interrupt short circuit currents, contacts last indefinitely, and there is no carbonization of the oil.

HAS ALL THE **KYLE** SAFETY FEATURES

1
Tank, cover, and operating handle are dead. Tank may be grounded.

2
Mechanism cooled, and insulated from tank, by transformer oil.

3
Standard cover type bushings. Terminals are the only hot spots.

4
Trip-free operating handle.

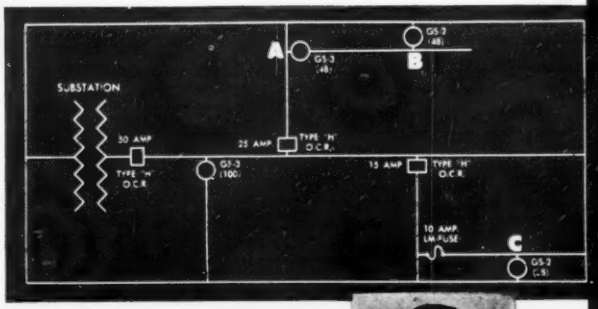
RATINGS:
Seven sizes, with minimum tripping current 8 to 100 amps to coordinate with reclosers rated from 3 to 50 amps; maximum operating current 150 to 1200 amps; 2400 to 15,000 volts. Ratings may be changed by changing coils in the field. Weight with oil about 120 pounds. Crossarm or direct pole mounting hangers.

Get the whole story !

For details, dimensions, ratings, mountings, and a complete description of how Kyle type GS sectionalizers operate, ask the L-M Field Engineer for a copy of this Bulletin CR3, or write Kyle Company division of Line Material Co., Box 2077, Milwaukee 1, Wisconsin.

To Protect Your Lines with Kyle Type GS Sectionalizers

The diagram shows how it is done: *Point A* shows a sectionalizer set to open on the third recloser operation, indicated by GS-3. *Point B:* further sectionalizing by setting the sectionalizer to open on the second operation of recloser—indicated by GS-2. *Result:* a permanent fault beyond *B* causes sectionalizer GS-2 to lock out after second recloser operation; service is maintained on the branch protected by sectionalizer GS-3 at *A*. *Point C:* Sectionalizer GS-2 set to open on second recloser operation isolates a permanent fault before the back-up fuses are damaged or blown by the third operation of the recloser. Kyle Sectionalizers also will replace branch line fuses on systems protected by Kyle Type H Reclosers, giving you complete automatic protection.



KYLE COMPANY
division of Line Material Company, Box 2077, Milwaukee 1, Wisconsin

7120

LINE MATERIAL Kyle Sectionalizers

Complete Coordinated Equipment for All Distribution Requirements

THE BEST TRANSFORMER FINISH NOW TESTS 50% BETTER

We agree with you—paint *is* important. It's often the only maintenance a good transformer will ever need.

So, it has been gratifying to have you tell us, for a decade now, that the finish on Spirakore* transformers is tops. However, unless you've seen a ***new*** Spirakore transformer, built in the last two years, you haven't seen the latest—and best!

We still shot blast, completely, every transformer tank. We still use zinc paint ***under*** all welded-on parts. We still use a rust-inhibiting primer. And to our synthetic Glyptal paint, which until two years ago beat anything we knew of, we've added a clear plastic-like material called melamine. Result: 50% increase in weather durability! 50% greater resistance to water absorption! 25% better color retention!

JUST ONE OF MANY IMPROVEMENTS

Today, as 10 years ago when lighter, smaller Spirakore transformers made history, Spirakore still leads the field. Besides better paint, you get Spirakore design in all single-phase ratings—for greater savings in size and weight. You get improved impulse strength. You get improved operating characteristics. You get sealed tank construction—which greatly prolongs oil life. And you get improved accessibility even with the complete sealing.

Yes, Spirakore is the finest distribution transformer we have ever made, the finest you can buy. Ask for Bulletins GEA-4885 and GEA-4521. ***Apparatus Department, General Electric Co. Schenectady 5, New York.***

*Reg. U.S. Pat Off.

GE Spirakore Transformers

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities

AVAILABLE SOON

. . . reserve your copy now

BTC's new catalog of Drop Forged Hi-Line Hardware will soon be coming off the press. The first edition to appear since the war, it contains valuable information you'll want to have on hand for ready reference—pictures, blueprints and complete specifications on BTC's entire line of Drop Forged Steel, Aluminum and Bronze Hi-Line Hardware.

This 40-page BTC catalog will be sent to you without charge by the company that pioneered the first and only full line of standard drop forged high-line hardware. Simply fill in and mail the coupon below — but do it now, so that your copy can be mailed when it's ready.

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Metal Products Manufacturers for over 100 Years

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Please reserve my copy of the new BTC hi-line hardware catalog.

NAME _____ TITLE _____

COMPANY _____

STREET _____

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FOR
more load

USE TYPE ML MULTI-LEAD PAPER INSULATED CABLES

● For cable users who desire an increase in the possibilities of emergency cable ratings, with no radical departure from present-day "solid" cable construction, we offer Type ML (Multi-Lead) Cables. This construction consists of three orthodox single-conductor paper-and-lead cables stranded together, without fillers and without any over-all binders, to provide for three-phase distribution.

ADVANTAGES

The use of Type ML Cable attacks the problem of cable overload and of severe load fluctuation from several different angles:

1. The loose assembly of conductors permits them to compensate for expansion in length by *radial* rather than longitudinal movement.

2. The individual lead sheaths, because of their smaller diameter, bend more readily, with less strain, and less danger of cracking due to lead fatigue.

3. In Type ML Cables, as compared to three-conductor cables, the diameters of the lead sheaths are reduced in greater proportion than their thickness. Thus, they are better able to withstand internal pressure without rupture.

HANDLES MORE LOAD—SAFELY

In actual use, Type ML Cable shows a number of advantages: (1) it is possible to operate it at maximum standard temperature ratings or, in emergencies, above these limits without danger of sheath failure; (2) an easier training problem in small manholes; (3) greater ease in making "L" taps and single-phase load diversions; (4) elimination of trifurcating joints for use of single-conductor potheads; and (5) simplicity of installation.

Write for complete engineering information on Type ML Cables and how they can handle *more load* without danger of sheath rupture.

AMERICAN STEEL & WIRE COMPANY, GENERAL OFFICES: CLEVELAND, OHIO
COLUMBIA STEEL COMPANY, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
TENNESSEE COAL, IRON & RAILROAD COMPANY, BIRMINGHAM, SOUTHERN DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

Paper Insulated Cable

USS

UNITED STATES STEEL

The a-c secondary network system is now recognized as the lowest-cost system for providing high-quality service to heavy load areas. While normally used for business sections of cities—50,000 or more in population—it will frequently pay its way in smaller towns as well.

But—to realize the full savings possible with networks, you should use standardized network equipment. For example:

YOU SAVE ON INSTALLATION when you specify

Standardized Network Equipment

NARROWER VAULTS—With widths of 4½ feet or less, vaults can almost always be built between building line and curb—the best location from the standpoints of real estate, construction, and servicing. The problem of roof-slab construction is appreciably reduced. Complete servicing can be carried out from the two ends where all accessories and connections are grouped.

SHALLOWER VAULTS—One to two feet less depth permits substantial savings in excavating and construction costs. Vault drainage is also simplified—though both the vault-type and the subway-type transformer will operate without damage even if completely submerged. High-and low-voltage terminals are well below transformer top—providing room for large-radius cable bends.

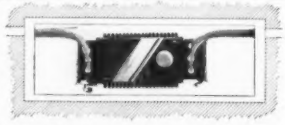
PLUS

FASTER DELIVERY—G-E standardized network transformers and protectors can be supplied on shorter delivery.

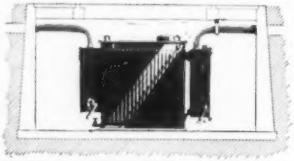
LOWER PRICE—The cost reductions due to repetitive manufacture are passed on to you in the form of lower prices.

LESS MAINTENANCE—G-E standardized network units have welded construction that eliminates major gaskets. Accessories are conveniently grouped at the high-voltage end. Network protector with plug in relays slides out on rails for quick inspection.

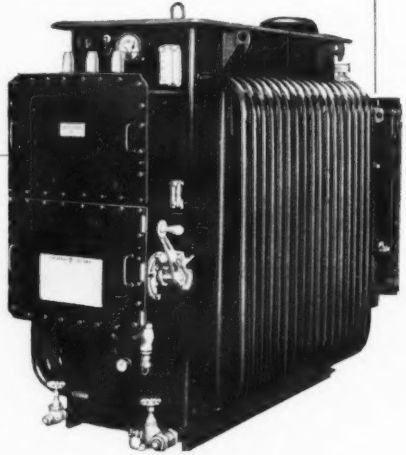
Ask your G-E representative or write to Apparatus Dept., General Electric Company, Schenectady 5, N. Y. for full information on standardized network equipment. Bulletin GEA-5024 describes network transformers; GEA-2017, network protectors.



With manhole openings at both ends, vault need be only 14' long, 4½' wide for 500-kva transformers.



A clear depth of 7' below roof slab will provide sufficient room for maintenance and inspection.



GENERAL ELECTRIC

402-78

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

FOR ELECTRICAL &

GENERAL PURPOSE JOBS

● Security Tape will never let you down. Its adhesive compound is not just sticky, but strong and rubbery. To handle tougher jobs, the fabric is unusually high in tensile strength. Security has no pinholes to cause leaks. Straight-tearing, non-ravelling.

ASK YOUR WHOLESALER FOR SECURITY

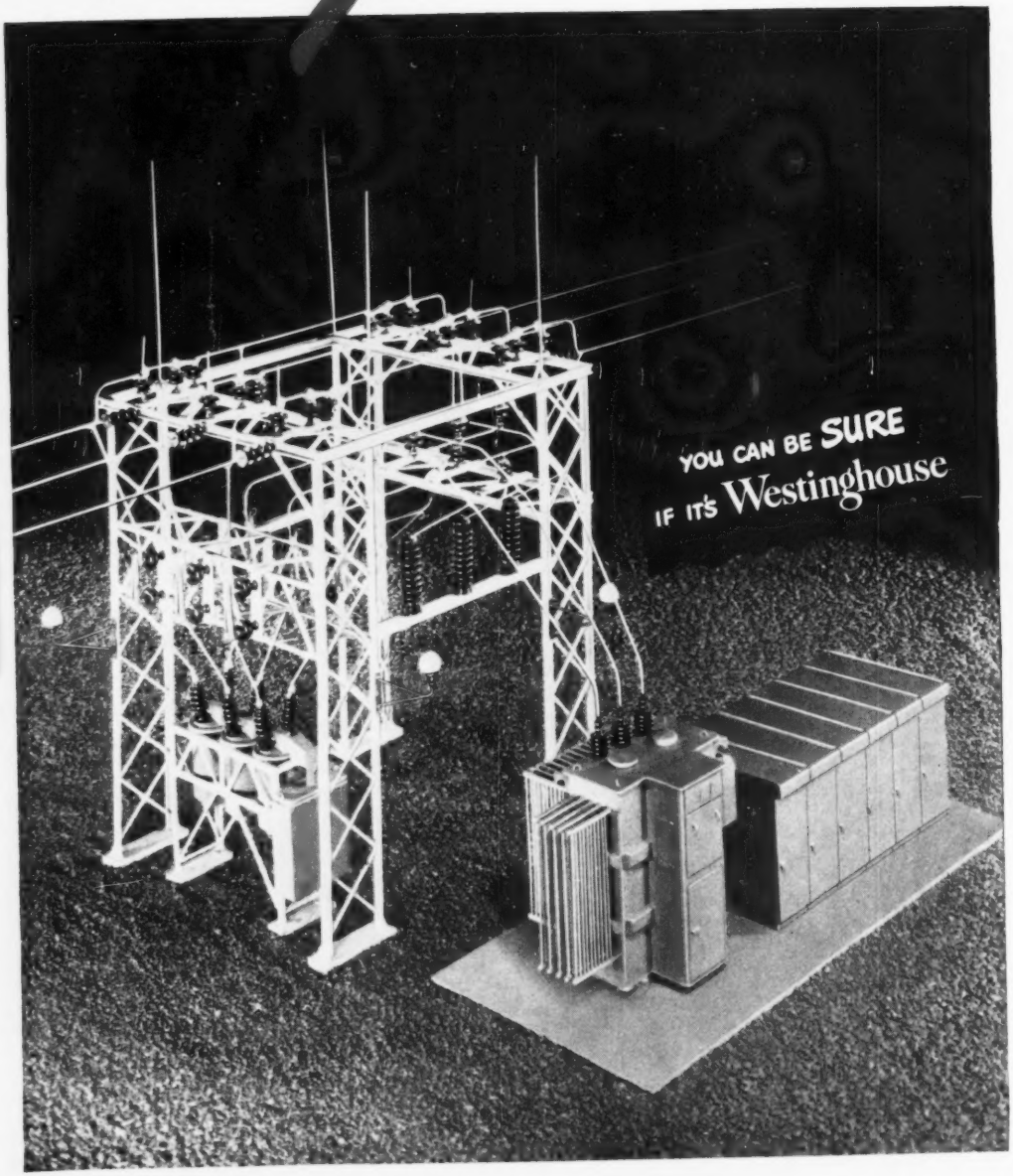
A QUALITY PRODUCT OF

U.S.RUBBER
SERVING THROUGH SCIENCE

TAPE DEPARTMENT
U. S. RUBBER BLDG., ROCKEFELLER CENTER, NEW YORK 20, N. Y.

UNITED STATES RUBBER COMPANY

Why BUY A FACTORY



COORDINATED SUBSTATION?

here are 3 very important reasons

FLEXIBILITY: Each component is designed to permit future expansion with minimum changes or additions. Due to their compactness and "unitized" type of construction, capacity can be readily added or removed, with maximum salvage value.

ECONOMY: Low manufacturing costs, realized through standardized design are passed on to you through the medium of highest quality equipment . . . liberally designed. You save the cost of special engineering, as well as ordering and coordinating many separate components.

UNDIVIDED RESPONSIBILITY: With the placement of *one order,* Westinghouse assumes undivided responsibility for the design, fabrication, and correct functioning of *all* substation equipment. You receive a complete *Coordinated Substation* that has been designed and manufactured as a ***unit*** . . . from incoming line to outgoing feeders . . . ready for installation. The result is a better substation . . . at a lower over-all cost.

* * *

For detailed information on substations for any system requirement call your nearest Westinghouse office, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Penna. J-97131

ONE Order . . . ONE Supplier . . . ONE Responsibility!

Westinghouse

PLANTS IN 25 CITIES . . . OFFICES EVERYWHERE

MODERN EQUIPMENT FOR *Better* DISTRIBUTION SYSTEMS

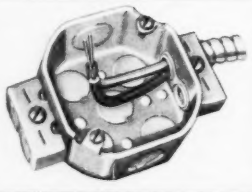
Here's the ONE Box with MANY APPLICATIONS...

RACO Jay Kay*

The *ALL-PURPOSE* CABLE BOX

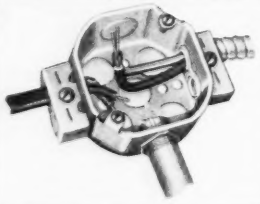
The "JAY-KAY" is back! The multiple purpose box is *in stock and available for immediate shipment.* ORDER IT NOW—for use with BX or FLEX—it accommodates either type quickly and efficiently. It's the *every purpose* box. Saves labor—external clamps not only provide more room within box, but speed assembly and installations.

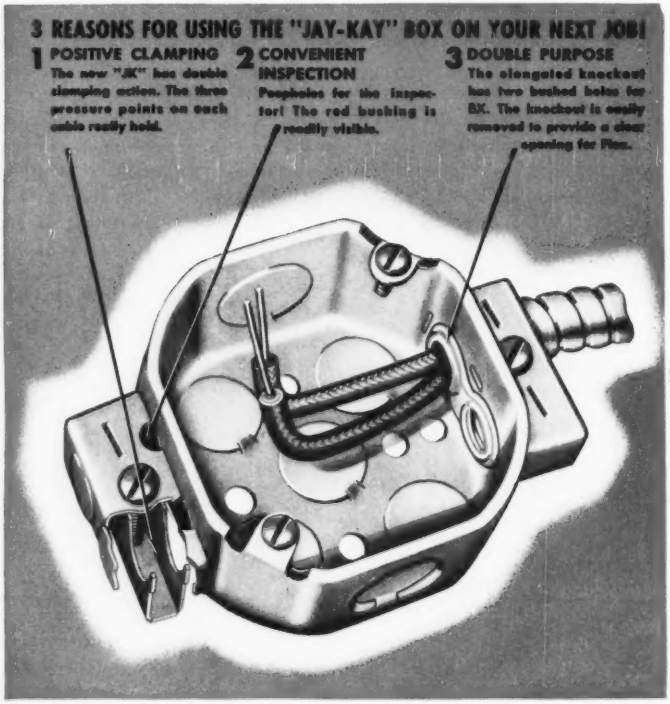
USE WITH BX



OR WITH FLEX

OR WITH PIPE AND BX OR FLEX




3 REASONS FOR USING THE "JAY-KAY" BOX ON YOUR NEXT JOB!
1 POSITIVE CLAMPING
The new "JK" has double clamping action. The three pressure points on each cable really hold.
2 CONVENIENT INSPECTION
Peepholes for the inspector! The red bushing is readily visible.
3 DOUBLE PURPOSE
The elongated knockout has two bushed holes for BX. The knockout is easily removed to provide a clear opening for Flex.

"JAY-KAY" BOXES ARE AVAILABLE ON BAR HANGERS, TOO!

HD-Deep Offset HS-Shallow Offset HSS-¼" Offset

*Reg. Trade Mark

RACO

ALL STEEL PRODUCTS

A Box for Every Need

ALL-STEEL EQUIPMENT INC.

500 KENSINGTON AVENUE • AURORA, ILLINOIS

This is General Electric's new secondary capacitor—3-kvar, 240-volts, single-phase—for pole mounting. It is approximately 40 per cent lower in price per kvar than similarly rated secondary capacitors heretofore available.

NOW! low-cost secondary capacitor

opens new fields in kvar generation

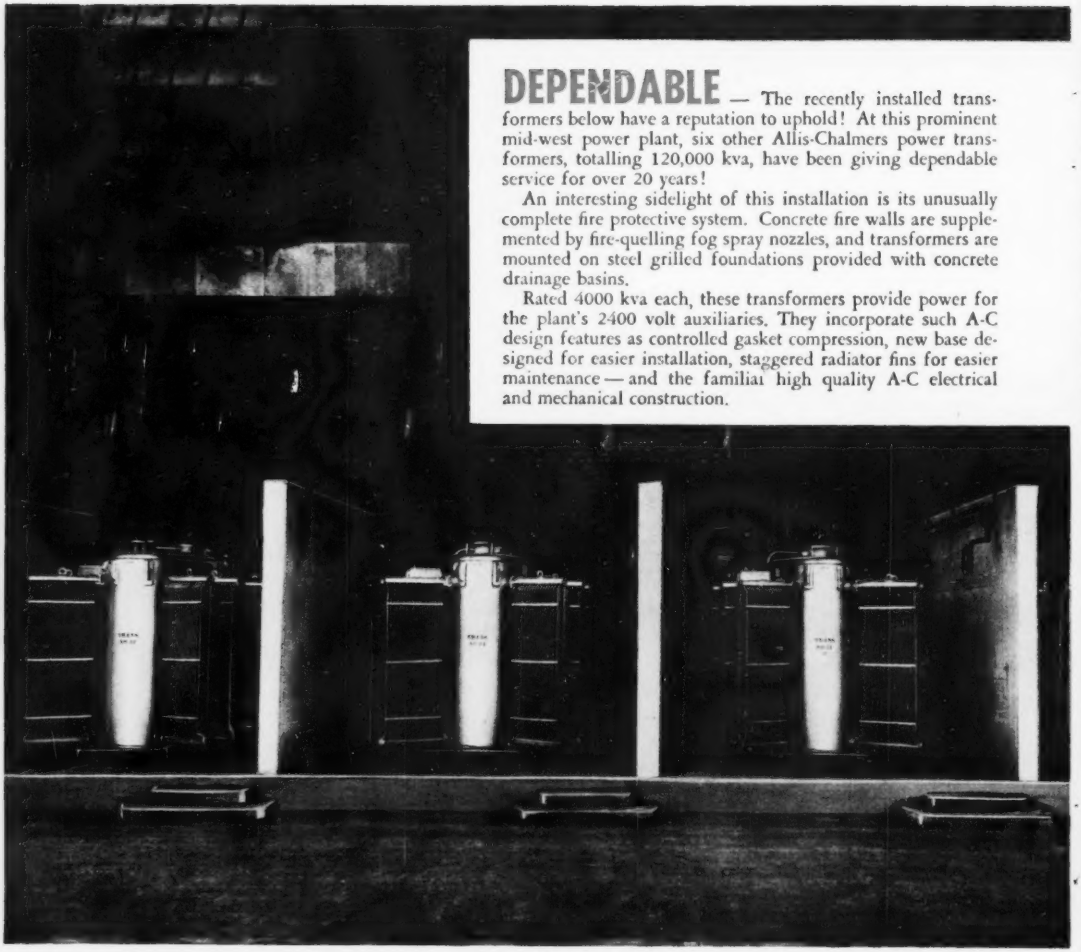
Secondary capacitors give the same benefits as primary capacitors for all the system, back to the generators, and in addition they decrease the voltage drop in the transformers and the secondary runs. Secondary capacitors will allow you to have more customers on each feeder, or existing customers can increase their load by 20 to 50 per cent for the same allowable voltage limits between the first and last customer with existing transformers.

Look into this new secondary capacitor for those load areas where either voltage drop or distribution transformer capacity is a problem. In many cases, it has proved most economical. We'd like to go over our calculations with you. Get in touch with your G-E representative, or write direct to *Apparatus Sales Divisions, General Electric Co., Pittsfield, Mass.*

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

ALLIS-CHALMERS
Dependable Because



DEPENDABLE — The recently installed transformers below have a reputation to uphold! At this prominent mid-west power plant, six other Allis-Chalmers power transformers, totalling 120,000 kva, have been giving dependable service for over 20 years!

An interesting sidelight of this installation is its unusually complete fire protective system. Concrete fire walls are supplemented by fire-quelling fog spray nozzles, and transformers are mounted on steel grilled foundations provided with concrete drainage basins.

Rated 4000 kva each, these transformers provide power for the plant's 2400 volt auxiliaries. They incorporate such A-C design features as controlled gasket compression, new base designed for easier installation, staggered radiator fins for easier maintenance — and the familiar high quality A-C electrical and mechanical construction.

A-C

...means Quality Power Transformers

Circular coils withstand high stresses. Coils are rigidly braced, vacuum dried and treated.

"Capacity Tailored" Load Ratio Control, featuring Allis-Chalmers 32-step regulation.

Controlled gasket compression insures correct pressure . . . increases life, effectiveness.

Strong, fin-type radiators rigidly braced. Staggered construction simplifies repainting.

Proved Oil-Sealed Inert Gas Protection provides simple, positive oil preservation.

Power Transformers.. They're Quality-Built!

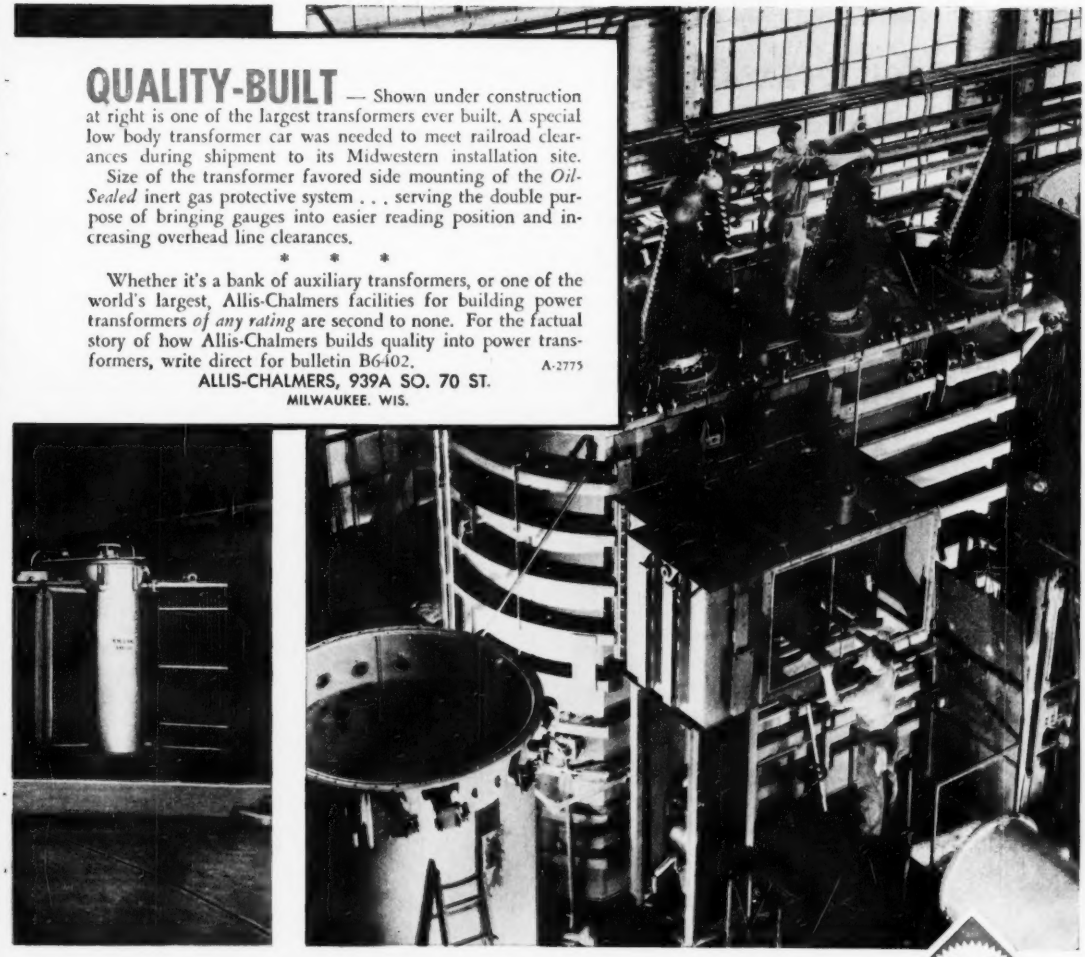
QUALITY-BUILT — Shown under construction at right is one of the largest transformers ever built. A special low body transformer car was needed to meet railroad clearances during shipment to its Midwestern installation site.

Size of the transformer favored side mounting of the *Oil-Sealed* inert gas protective system . . . serving the double purpose of bringing gauges into easier reading position and increasing overhead line clearances.

* * *

Whether it's a bank of auxiliary transformers, or one of the world's largest, Allis-Chalmers facilities for building power transformers *of any rating* are second to none. For the factual story of how Allis-Chalmers builds quality into power transformers, write direct for bulletin B6402. A-2775

ALLIS-CHALMERS, 939A SO. 70 ST.
MILWAUKEE. WIS.



ALLIS-CHALMERS

Pioneers in Power and Electrical Equipment From Generation Through Utilization

CRESCENT
IMPERVEX TRENCHWIRE

For Lowest Cost Underground Use

● CRESCENT IMPERVEX TRENCHWIRE provides the LOWEST COST, PERMANENT underground installation for services from power line to meter, for connecting several buildings from the same service, as on FARMS, ESTATES and INSTITUTIONS and for STREET, AIRPORT, BALL PARK, DRIVE-IN THEATRES, and other outdoor lighting and power circuits. Also extensively used by INDUSTRY in ducts for underground power circuits.

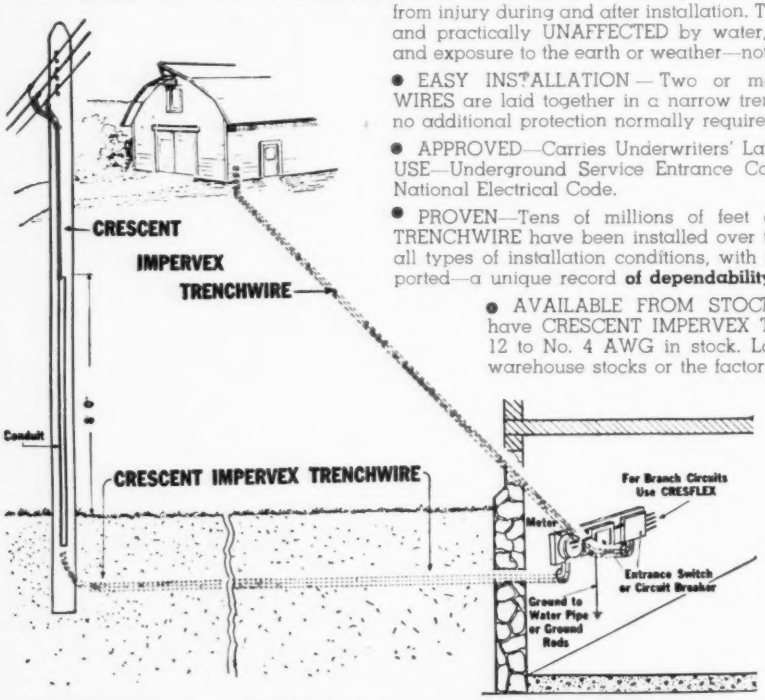
● CONSTRUCTION—The single copper conductor is insulated with IMPERVEX special moisture and heat-resisting rubber insulation. A tough NEOPRENE armor sheath is vulcanized over the insulation, protecting it from injury during and after installation. The cable is flame-retarding and practically UNAFFECTED by water, oil, acid, alkali, sunlight and exposure to the earth or weather—nothing to rot, rust or corrode.

● EASY INSTALLATION — Two or more IMPERVEX TRENCHWIRES are laid together in a narrow trench to form the cable with no additional protection normally required.

● APPROVED—Carries Underwriters' Laboratories Labels as TYPE USE—Underground Service Entrance Cable, and conforms to the National Electrical Code.

● PROVEN—Tens of millions of feet of CRESCENT IMPERVEX TRENCHWIRE have been installed over the last seven years under all types of installation conditions, with not one case of failure reported—a unique record **of dependability!**

● AVAILABLE FROM STOCK — Electrical wholesalers have CRESCENT IMPERVEX TRENCHWIRE in sizes No. 12 to No. 4 AWG in stock. Larger sizes available from warehouse stocks or the factory.



● BULLETIN No. 451 giving technical information on selection of proper size of conductor, etc. will be furnished on request.

CRESCENT
WIRE & CABLE
CRESCENT INSULATED WIRE & CABLE CO.
TRENTON, N. J.

Ease of Installation

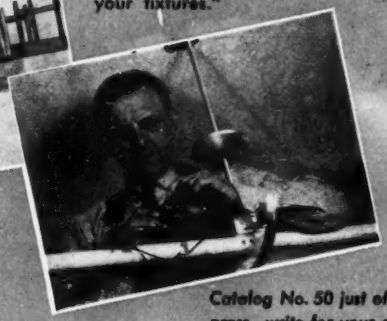
IS A FEATURE OF *Wakefield* LIGHTING EQUIPMENT

Almost like hanging a picture . . .

Everything hooks on to pre-installed straps . . .

A one-man job . . .

The secret is the pre-installed strap. First step is to secure a mounting strap to the outlet box. Next run a chalk line along the ceiling, measure off the required intervals and then attach the other mounting straps in the line. The easily assembled units are then hung on the mounting straps, unit by unit, the supporting band on the previously mounted unit providing the reflector support for the end of the next unit. A steel channel insures rigidity for the wireway, and snap-on wireway covers give accessibility for wiring. Writes one power company engineer: "Contractors have been vociferous in their praise of the ease with which they were able to install your fixtures."



RESIDENT LIGHTING SPECIALISTS

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1. **Fully Guaranteed**
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3. **Underwriters Approved**
4. **Certified Ballasts**

Catalog No. 50 just off the press—write for your copy!

Wakefield Over-ALL Lighting

THE F. W. WAKEFIELD BRASS COMPANY
VERMILION, OHIO

Now Available!

A GENERAL-PURPOSE* INSULATING VARNISH

G.E.'S NEW 9574

Now you can get a high-quality varnish for every type of winding except extra-high-speed armatures—General Electric's new general-purpose insulating varnish G-E 9574. Particularly easy to work with, G-E 9574 can be used at barrel gravity or reduced up to 20% with ordinary petroleum spirits. This clear varnish bakes and cures at temperatures as low as 212 F in conventional baking equipment. It easily penetrates the deepest coils, forming an even film. Its aging properties are excellent.

CHECK THESE CHARACTERISTICS

OUTSTANDING
Mechanical Strength

Build relative	Excellent
Adhesion	Excellent
Toughness	Excellent
Hardness	Excellent
Flexibility	Excellent
Penetration	Excellent
Bonding	Excellent
High-temp. bonding	Excellent

UNUSUAL
Chemical Resistance

Water	Excellent
Acid	Excellent
Alkali	Excellent
Oil	Excellent
Salt water	Excellent

EXCELLENT
Electrical Properties

Dielectric strength, volts/mil 1800-2000

Dielectric strength, after 24 hours' immersion in water at 25 C, volts/mil . . . 700

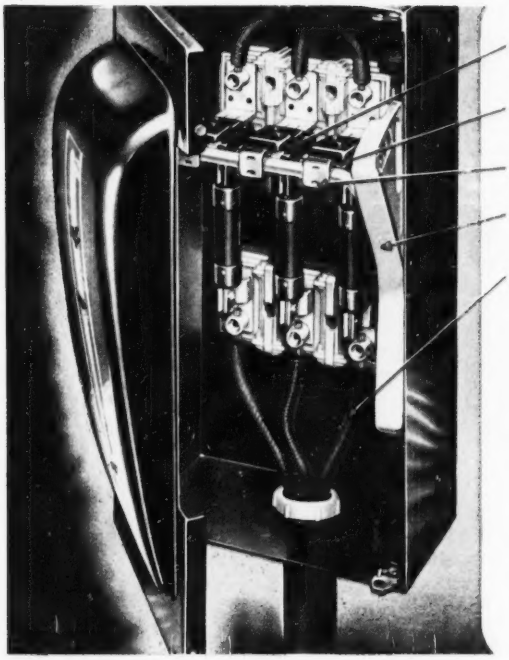
**G-E 9574 gives excellent results on all types of coils except extra-high-speed armatures. It is one of G.E.'s complete line of electrical insulating materials.*

FOR MORE DETAILS,
write for new bulletin to your local G-E Distributor or to Section 22-9, Chemical Department, General Electric Company, Pittsfield, Massachusetts.

You can put your confidence in—

GENERAL ELECTRIC

CD48-M4



1 **Dangerous arcs are snuffed instantaneously by BullDog's exclusive Vacu-Break Arcing Chamber.**

2 **Fuse failures and damaging high temperatures are reduced by self-aligning "Clampmatic Contacts."**

3 **Fewer moving parts means less chance for trouble—fewer calls for maintenance men.**

4 **No more broken switch handles. BullDog's husky rocker-type handle operates with maximum ease and is built to withstand abuse.**

5 **Skinned knuckles and distortion of cables are eliminated . . . ample wiring space for easy installation.**

BullDog Vacu-Break Safety Switches come in various capacities • BullDog manufactures Vacu-Break Safety Switches • SaffaFuse Panelboards • Superba and Rocker Type Lighting Panels • Switchboards • Circuit Master Breakers • "Lo-X" Feeder BUStribution Duct • "Plug-In" BUStribution Duct • Universal Trol-E-Duct for flexible lighting • Industrial Trol-E-Duct for portable tools, cranes, hoists.

BullDog Field Engineers welcome the opportunity to sit in with you in the early planning stages of a building project. Their knowledge of electrical distribution layout can mean savings in installation costs, as well as efficiency and reliability in actual operation. Why not take advantage of this service?

How to "black out" dangerous arcing

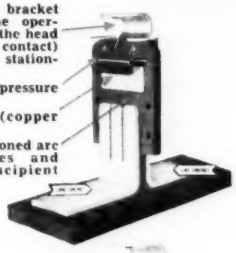
DAMAGE caused by uncontrolled arcing in a power switch is costly and dangerous—perhaps more than you think.

At the least, you stand the expense of excessive maintenance and frequent replacement of the unit. But there's often an unexpected price in ruined electrical equipment . . . or, even worse, injury to your employees.

In BullDog Vacu-Break Switches, electrical contact is made and broken in a special arc-resistant chamber. Arcs are "blacked out" . . . smothered by lack of oxygen before they have a chance to burn or pit contacts . . . or to build up dangerous temperatures.

Vacu-Break Switches make and break contact quickly and cleanly for added safety. BullDog's special "Clampmatic" contacts assure positive electrical connections for cool operation and long life.

Arc-resistant BullDog Safety Switches pay off in lowered maintenance due to the small number of moving parts, plus the Vacu-Break principle. Your nearby BullDog Field Engineer will be glad to show you an installation in your own neighborhood.

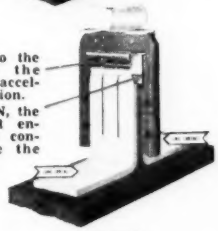


1 **Switch head bracket attached to the operating lever pushes the head (enclosing moving contact) in and out on the stationary contacts.**

Steel spring for pressure contact.

Moving contact (copper slug).

Close-fitting partitioned arc chamber confines and snuffs out all incipient arcing.



2 **When operated to the OFF position, the Clampmatic spring accelerates disconnect action.**

When operated to ON, the moving contact first engages the stationary contact prongs before the spring moves down.

3 **In full ON position, the moving contact fits tightly between "Line" and "Load" contacts under full pressure by the Clampmatic spring.**

BULLDOG ELECTRIC PRODUCTS COMPANY

DETROIT 32, MICHIGAN • FIELD OFFICES IN ALL PRINCIPAL CITIES

IN CANADA: BULLDOG ELECTRIC PRODUCTS OF CANADA, LTD., TORONTO

BULLDOG

HEADQUARTERS FOR ELECTRICAL DISTRIBUTION

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1445 Stevenson St. Tel. Hemlock 1-2470
San Francisco 3, Calif.

Mullenbach Electrical Manufacturing Co.
2300 East 27th Street Tel. Logan 5-5331
Los Angeles 11, Calif.

OVER 78 WAYS TO MAKE SURE CONDUITS STAY PUT!

O.Z. has 'em ...IN STOCK

When you need U-BOLTS for that conduit or cable clamping job, try O-Z.

WHY?

BECAUSE the O-Z line is *in stock*, ready for immediate shipment.

BECAUSE the stock O-Z line has over 78 sizes and types for conduits from ½" to 6". As just one example, you can get *three* bolt diameters, for 1", 1¼" or 1½" conduit. You can get O-Z U-BOLTS, from stock of Everdur, steel cadmium plated or steel hot-dip galvanized. They come with nuts and flat washers, with or without saddles. They provide for clamping to a ⅜" thick plate using nuts and washers on each leg.

BECAUSE O. Z. will manufacture U-BOLTS of any size or material to meet your specifications.

There are thousands of O-Z products designed to help you put power where you want it, and your O-Z Distributor is the man to see about them. Send for illustrated catalog.

and Remember!

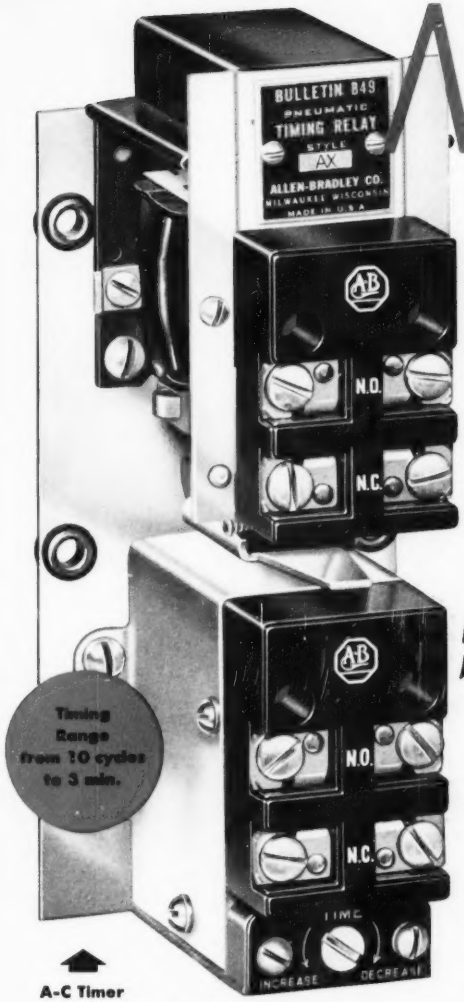
THEY'RE O.K. IF THEY'RE O.Z.

O.Z. ELECTRICAL MANUFACTURING COMPANY, INC.

262 BOND STREET · BROOKLYN 2, N. Y.

CONDUIT FITTINGS
CABLE TERMINATORS
CAST IRON BOXES
GROUNDING DEVICES
SOLDERLESS CONNECTORS
POWER CONNECTORS

3060



A-C Timer
with Auxiliary Contacts

D-C
Timer

NEW...

Bulletin 849

PNEUMATIC TIMING RELAY

Good for Millions of Operations

- FOR "DASH UP" OR "DASH DOWN" OPERATION
- AVAILABLE FOR NEMA TYPE 1, 4, 7, and 9 APPLICATIONS

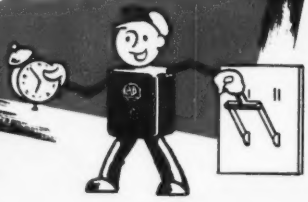
This new, compact, solenoid type, pneumatic timing relay utilizes a synthetic rubber bellows for controlling the tripping time. Has a range of from 10 cycles to 3 minutes, and an accuracy of approximately ±10%. Its setting is easily adjustable over a wide range, and the relay resets instantaneously. This timer will provide satisfactory operation irrespective of temperature, humidity, or vibration conditions. Available with quick make and quick break, double pole, silver alloy main contacts—one set normally open and one set normally closed. Terminals are readily accessible from the front. A duplicate set of contacts for pilot control can also be provided, actuated directly from the solenoid. The unit can be readily changed from "dash up" to "dash down" operation by simply inverting the solenoid. Write for information on this new Bulletin 849 Pneumatic Timing Relay.

ALLEN-BRADLEY CO.
1316 S. Second St., Milwaukee 4, Wis.

ALLEN-BRADLEY
QUALITY
MOTOR CONTROL

A-B Quality

OTHER RELIABLE TIMING RELAYS TO FIT YOUR REQUIREMENTS

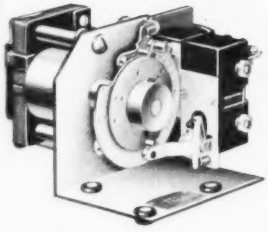


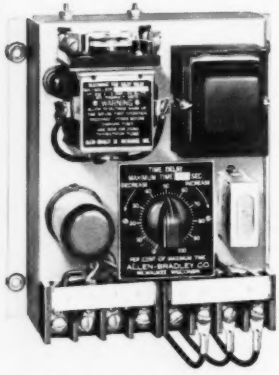
BULLETIN 850 MOTOR DRIVEN TIMING RELAY

Designed for timing comparatively long intervals with a high degree of accuracy where high speed recycling is not required. Furnished in several ranges with a maximum time delay of from 1 to 15 minutes. Variations in time between successive operations are less than 1% of the full scale range. Its synchronous motor is suitable for a-c pilot control service only. Has a single pole switch for normally open or normally closed operations.

BULLETIN 850 TYPE L LAUNDRY TIMER

Similar in design to the Bulletin 850 Motor Driven Timing Relay, this timer is specially designed for controlling washing machines and other equipment where the motor is run for a given period in one direction, reversed, and then run in the opposite direction.





BULLETIN 852 ELECTRONIC TIMING RELAY

Designed primarily for exact timing in frequent operation. It has a range of 20 to 1 and is provided in eight timing ranges with from ½ second up to 2 minutes maximum time delay. The reset time is approximately one-tenth of the maximum time delay. This is a flexible timer that can be recycled rapidly over long periods. Furnished with two normally open, two normally closed, or one normally open and one normally closed contacts.

BULLETIN 848 FLUID DASHPOT TIMING RELAY

Here is a magnetic type timing relay that combines simplicity, dependability, and low cost. It can be used in many applications where reliability is more important than exactness of timing. Operates at ambient temperatures from +120 F to −30 F without undue variations in timing. Has an adjustable range from 2 to 20 seconds and is available for a.c. or d.c. . . . in single pole construction . . . with either normally open or normally closed contacts.

ALLEN-BRADLEY

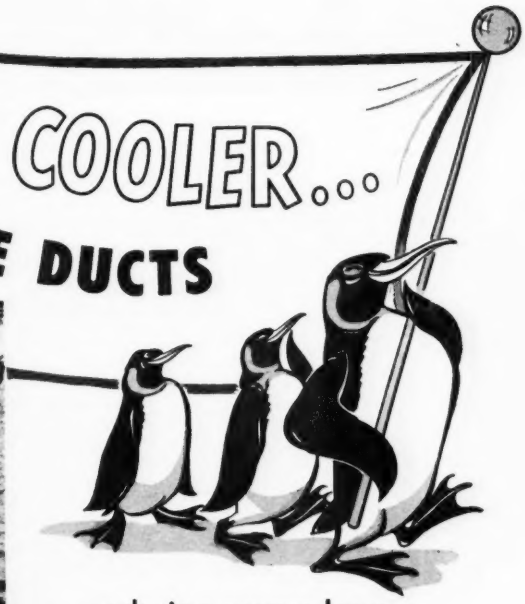
QUALITY

MOTOR CONTROL

Write for New Timer Bulletin

Allen-Bradley Co.,
1316 S. Second St.,
Milwaukee 4, Wis.

Cables run COOLER...
in TRANSITE DUCTS



... reducing copper losses
... increasing current capacity
... prolonging insulation life

YOU REDUCE copper losses ... increase current carrying capacity ... and prolong insulation life, when you run your cables in Transite* Ducts.

Current carrying capacities can be increased in a typical duct bank as much as 5%, or I^2R losses can be reduced 11%, for cables located in Transite as compared with other ducts used for power circuits.

And, Transite Ducts assure permanent duct banks because Transite is incombustible; is immune to rust and rot; is unaffected by electrolysis; will not slag under action of an arc, and will retain its high original strength.

An unusually smooth bore assures no injury to cable sheath, either in natural movement under load or when pulling-in cables. Long, lightweight lengths can be quickly and economically installed. In addition, a full line of fittings simplifies even the most complicated of installations.

For full information on Transite Ducts, write for Data Book DS-410. Johns-Manville, Box 290, New York 16, N. Y.

JM

*Reg. U. S. Pat. Off.

How Transite Ducts increase current carrying capacities

Type cable 3 cdr. 500 MCM Compack Sector, 15 KV
(6th Edition AEIC Spec.)
No. of cables—3 (all loaded in one bank)
Daily Load Factor—75%
Earth Temp. ambient—20 C

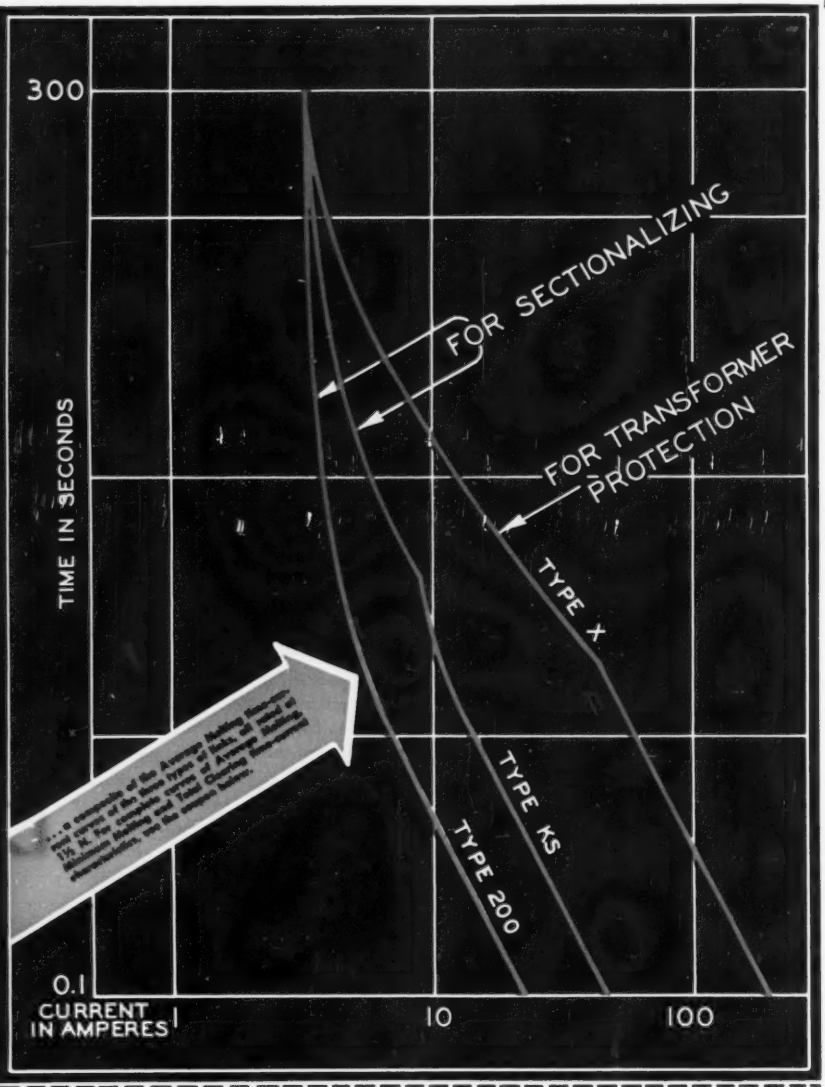
	Transite	Other
Total Therm. Res. to Dielectric Loss (C watts/ft.)	5.66	6.17
Total Therm. Res. to Copper Loss (C watts/ft.)	4.44	4.95
Temp. Rise from Dielectric loss (C)	1.9	2.1
Allowable Rise for Copper loss (C)	59.1	58.9
Allowable Watts per ft. cable	4.44	3.96
Allowable Current—(Amps. per cdr.)	386.	365.
Allowable Current—(Relative %)	105.6	100.

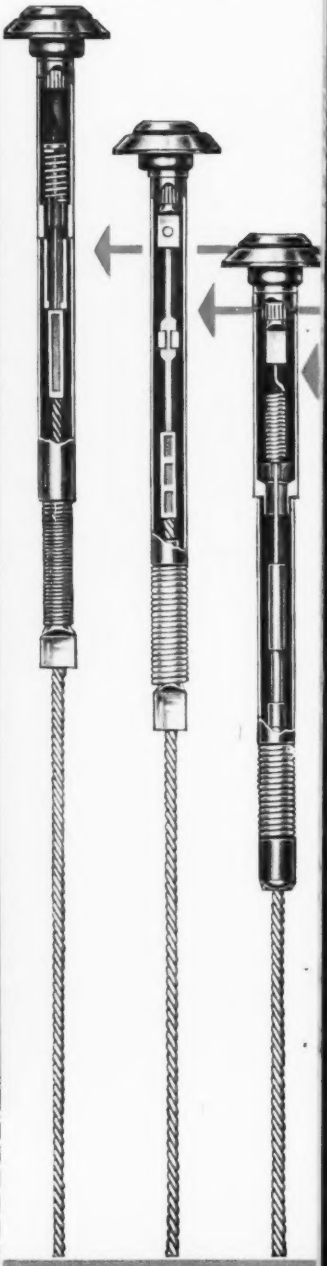
Johns-Manville *Transite Ducts*

TRANSITE KORDUCT—for installation in concrete

TRANSITE CONDUIT—for exposed work and installation underground without a concrete encasement

3 Speeds for Better





BETTER

JAMES R. KEARNEY CORPORATION
4236 Clayton Avenue
St. Louis 10, Missouri

13

Gentlemen:

Please send me the complete set of time-current curves on the fuse links checked below:—

- ☐ TYPE 200
- ☐ TYPE K-S
- ☐ TYPE X

Name .....

Company .....

Address .....

Fuse Co-ordination

with KEARNEY FUSE LINKS

FAST — **The Kearney Type 200 Fuse Link Isolates Those Troublesome Circuits, Maintaining Service on Adjacent Lines**

MEDIUM — **Reducing Outages on Circuits Subject to Switching and Minor Lightning Surges is a Job for the Type K-S**

SLOW — **The Type X Link Combines Small Transformer Protection With Slow Surge Response, Providing Maximum Service**

Type 200 . . . Certain circuits prove to be more troublesome than others. When a line is subject to dangerous long-time overloads and surges, continuity of service in adjacent circuits demands fast action in isolating the troublesome line. This fast action protection is made possible by the accurate, durable characteristics of the pure tin used in the Type 200 Fuse Link. The low temperature operation of this link assures that peak loads may be carried without danger of outages. This two-in-one feature of the Type 200 Link makes it a "must" in any efficient fuse-coordination plan.

Type K-S . . . Where switching, motor-starting and lightning surges are common, maintain service by using the Type K-S Fuse Link. Low temperature operation accommodates peak loads and dragging overloads with full protection to line equipment and without damage to the cutout. High surge capacity means that the K-S Fuse Link can differentiate between harmless surges and overloads, and those that are damaging. In a thorough coordination plan, fuse links must coordinate not only with other fuses, but also with circuit breakers, and the medium speed characteristic of the K-S Link provides for the proper teamwork.

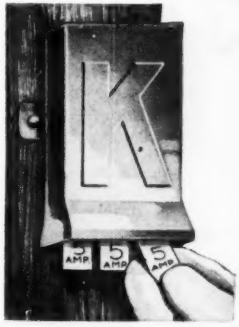
Type X . . . Designed to match the safe-loading curves of small transformers, the Type X Fuse Link keeps transformers in service during heavy overload periods and surges, and yet fuses in an instant when faults persist or reach dangerous ranges. The slow speed operation means satisfied customers and lowered expense due to unnecessary outages. The high breaking strength of the Type X Link provides security against mechanical failure in applications where apparatus-jarring surges are frequent. Like the other fuses of the Kearney line, the Type X is designed to open at approximately 220% of rated current in five minutes.

An Exclusive Kearney Feature

An added convenience with all three fuses of the Kearney line is the PUL-TAB FUSE-PAK. Individually wrapped fuse links are packaged in groups of five and cartons of 25, combining maximum protection with the handiness of the PUL-TAB. Fuse ratings are indicated on the TAB, assuring positive identification in the field.

Fuse Link Dispenser . . . Keeping the right link at the right place, at the right time, is easy with the Fuse Link Dispenser. Specially designed for mounting on poles at the cutout location, the dispenser will hold one PUL-TAB FUSE-PAK containing five links.

West Coast Distributor: MAYDWELL and HARTZELL, Inc.



Always Specify JAMES R. KEARNEY CORPORATION ST. LOUIS, MO. *for the Job . . .*

-143

CONSTRUCTION – *SAFER* MAINTENANCE

From Newark, Ohio...
More Kaiser Aluminum Cable!

More than anything we could say, the above picture illustrates the rapidly increasing shipments of Kaiser Aluminum Cable produced by Permanente Metals.

First deliveries were made from centrally located Newark, Ohio last June — *three months ahead of schedule.*

Kaiser Aluminum Cable is being shipped in ever increasing quantities... to electric power projects serving homes, industry and farms throughout the nation.

Fully integrated operations — which control production from bauxite processing to finished cable — assures you of dependable deliveries of Kaiser Aluminum Cable.

Do you need aluminum conductor? To take advantage of early delivery schedules, contact any office of Permanente Products' nationwide sales organization.

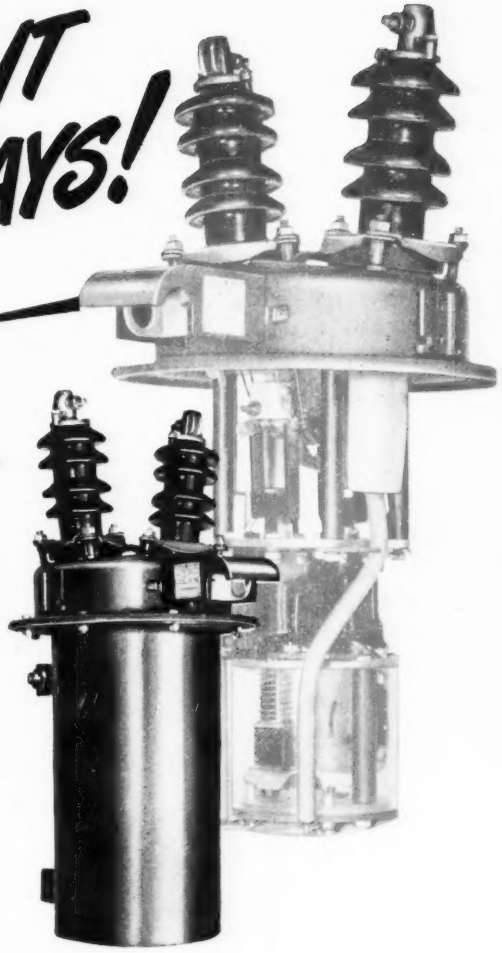
Permanente Metals

PRODUCER OF

Kaiser Aluminum Cable

SOLD BY PERMANENTE PRODUCTS COMPANY, KAISER BUILDING, OAKLAND 12, CALIFORNIA . . . WITH OFFICES IN:
Atlanta • Boston • Chicago • Cincinnati • Cleveland • Dallas • Denver • Detroit • Houston • Indianapolis • Kansas City • Los Angeles
Milwaukee • Minneapolis • New York • Oakland • Philadelphia • Portland, Ore. • Seattle • Spokane • St. Louis • Wichita
EXPORT OFFICE, KAISER BUILDING, OAKLAND, CALIFORNIA
Also available through General Electric Supply Corporation, Westinghouse Electric Supply Company, and Line Material Company

COMPARE IT THREE WAYS!



The FR-1 Relayed Automatic Recloser

1 FOR MINIMIZING OUTAGES

Fuses and conductors are protected by instantaneous first and second operations—very fast openings—regardless of ambient temperature, viscosity or condition of oil.

- False operations are prevented by precision timing—plus relay control of the interrupter—and, again irrespective of temperature or oil.
- Re-setting is 5- to 15-times faster than other types of reclosers—protecting against rapidly recurring temporary faults, even successive line flashovers by lightning strokes seconds apart.
- Inrush current cannot instantaneously retrip recloser.
- Fewer outages on every score.

2 FOR ECONOMIES IN MAINTAINING SERVICE

Fewer outages mean, of course, fewer service trips. Moreover the unavoidable outages can be located more quickly and service restored in less time.

- With the FR-1, many series fuses can be used to further sectionalize the system with permanent faults always confined to a minimum number of consumers. As many as 4 to 7 different ratings of fuses can be reliably co-ordinated with each rating of recloser because of the established minimum and maximum characteristics of the recloser and year-round accuracy.

3 FOR ENDURANCE IN SERVICE

Oil Blast interruption of arc in ½ cycle means longer life—minimum wear of arc-resisting Elkonite contacts and minimum carbonization of oil.

- Gears of heavy-duty escapement timer are case-hardened and plated. Timer operates in air above the oil, for lasting fidelity of timing and independence from temperature changes or viscosity of oil.
- Coils will withstand continuous current up to two times rating (up to minimum pickup current) without damage—unexpected overloads can't hurt the coils.
- Built-in Thyrite valve element by-passes lightning and surge voltages—protects turn insulation of coils.

Bulletin GEA-4934 describes in detail this unique recloser, gives data on co-ordination with fuse links and tells about its "locked-closed" alternate operating function (convertible in the field) which simplifies and extends co-ordination with fuses. For your copy address your G-E Apparatus Sales Office or write *Apparatus Dept., General Electric Company, Schenectady 5, New York.*

GENERAL ELECTRIC

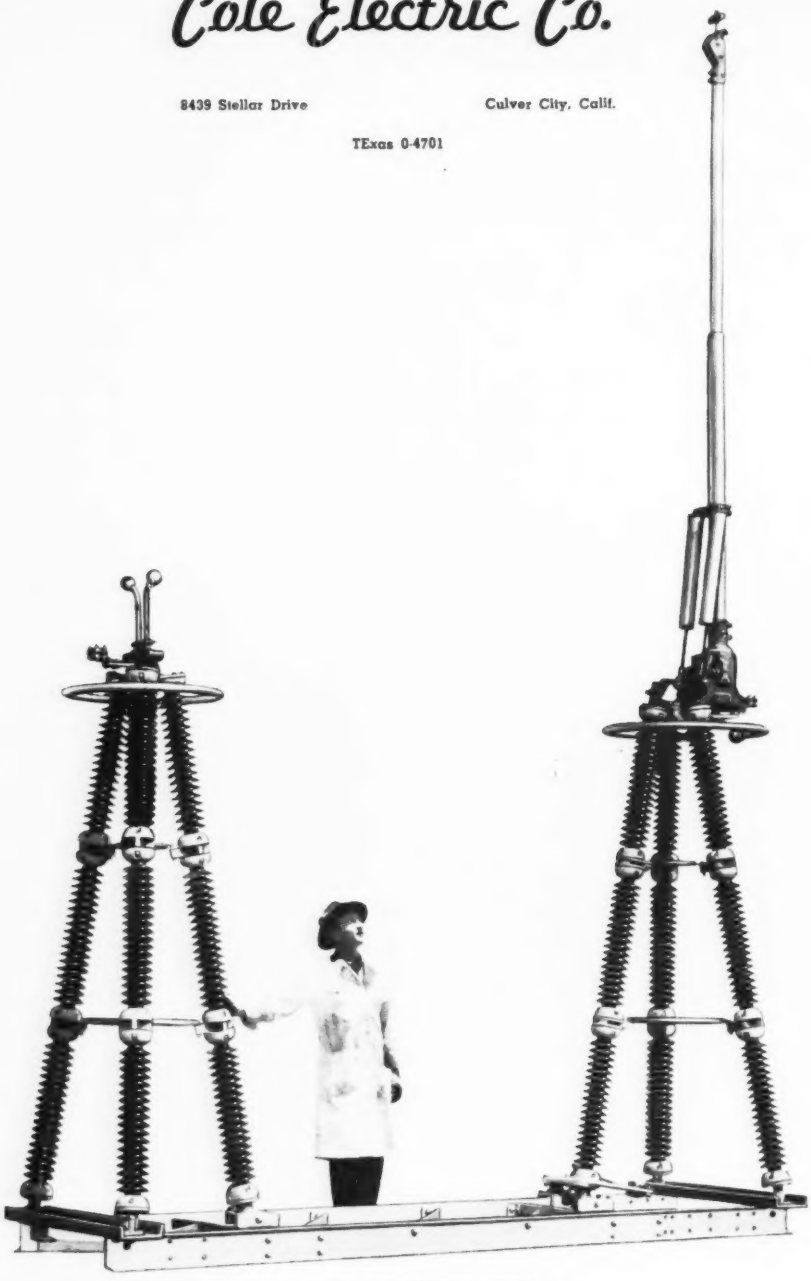
406-34

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

Cole Electric Co.

8439 Stellar Drive Culver City, Calif.

TExas 0-4701



AIR BREAK DISCONNECTING SWITCH
230,000 Volts—1200 Amperes—Type MJ
Vertical Break—Three Pole, Single Throw
Group Operated
(One pole shown)

"Anaconda"...always means

Keeping-Ahead-of-the-Parade

TAKE CB* CABLE WITH F-3**
ALLOY SHEATH FOR INSTANCE:

In 1939

Anaconda engineers introduced Type CB cable because ordinary paper-insulated cable wasn't good enough. Carbon-black paper removes oxidation products from the insulation, eliminates ionization discharges. These and other desirable properties increase insulation stability and assure longer cable life.

In 1944

Anaconda engineers added the resilient binder for they had found a way to reduce sheath strain during daily load cycles. Made of special carbon-black paper, it is strong yet resilient, results in lower stresses in the sheath due to cushioning effect, conducts radially and is fully adequate against magnetic forces.

In 1944,

because they know cable life often is shortened by premature sheath failure, Anaconda engineers gave this Type CB cable the amazing F-3 alloy-lead sheath. It is the best all-around alloy ever offered in the industry . . . resists slow-bending fatigue, creep (expansion), bursting, abrasion, vibration fatigue and does not age-harden . . . actually extends sheath life more than three times ordinary sheath. It has truly earned the name "indefatigable."

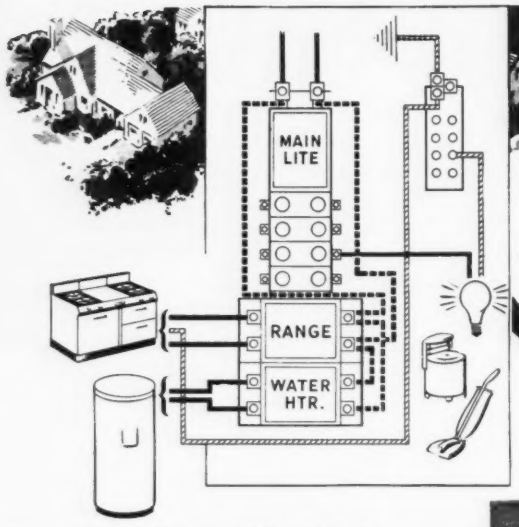
*CB—Carbon-Black, Trade Mark Registered U. S. Patent Office
**F-3—Arsenic-Lead alloy (U. S. Patents 2,300,788 and 2,374,755)

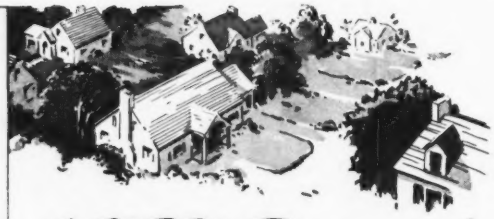
THIS COMBINATION permits heavier loads for longer life!

ANACONDA
from mine to consumer

ANACONDA WIRE & CABLE COMPANY

25 Broadway, New York 4, N. Y.

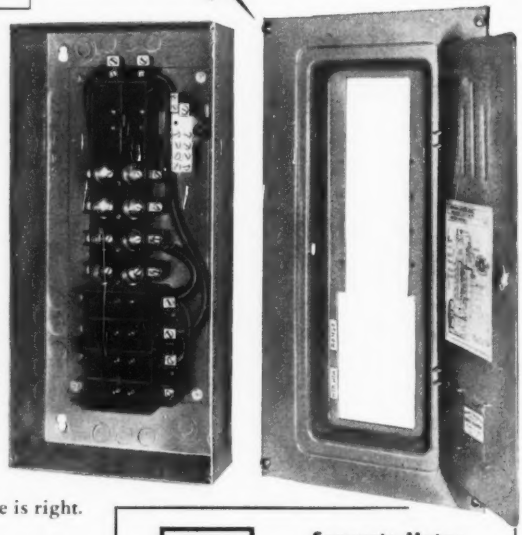




A NEW Reason why the Switch is to General

General Switch Cat. No. 663-108, Main-Range-Water Heater Combination Triple Pullout Unit

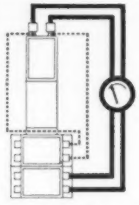
100 Amp main lugs feed the 60 Amp pull-out switch controlling from 4 to as many as 12 plug fused lighting circuits. The main lugs also feed the Range and Water Heater pullout switches . . . available in 30 or 60 Amp and non-interchangeable to prevent overfusing. Flush or Surface. Underwriter Laboratories approved.



THE new GENERAL Main-Range-Water Heater Combination Triple Pullout Unit, the latest addition to the GENERAL SWITCH extensive line of enclosed switches and panels, means a real saving in time and materials, is a neat, compact unit, is thoroughly dependable and . . . the price is right.

The development of this all-in-one unit is another step forward in the GENERAL SWITCH planned program of product development of "unitized" equipment for simplified electrical systems at lower cost.

Save time and save money . . . investigate this new unit and *Switch to* GENERAL *today*! Available everywhere exclusively through wholesalers.

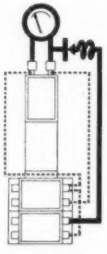


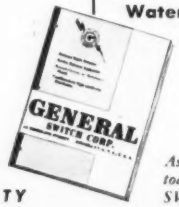
Separate Meter for Water Heater

Simply remove jumpers and feed the water heater pullout switch through separate meter.

Carrier Relay or Time Clock Water Heater Disconnect

Remove one jumper and connect water heater switch through disconnect element of meter.



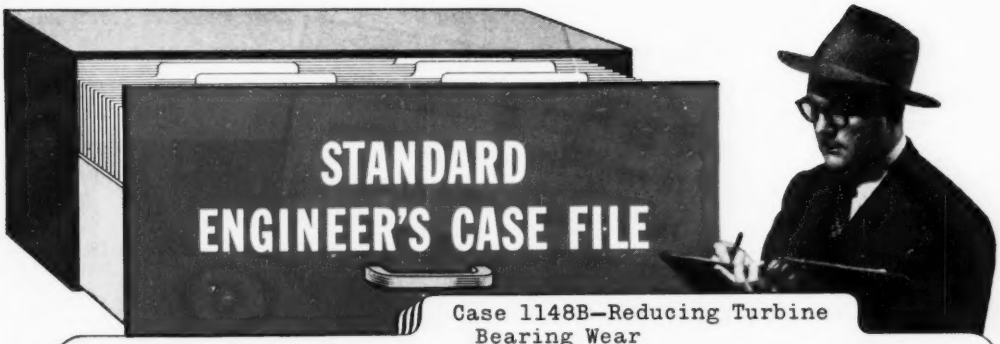


Ask your wholesaler or write today for the GENERAL SWITCH 68-page catalog.

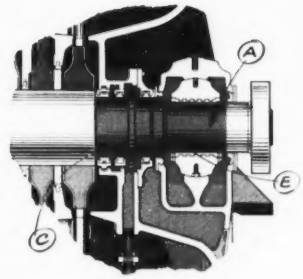
General Switch Corp.

49 Roebling Street Brooklyn 11, N. Y.

SALES OFFICES IN EVERY MAJOR CITY



Case 1148B—Reducing Turbine Bearing Wear



TURBINE BEARING

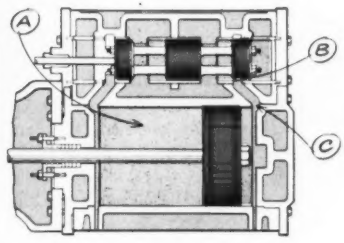
There was no sign of acidity or deterioration in Calol OC Turbine Oil when, after six years use in a heavily-loaded turbine, a sample was given a laboratory analysis. Bearings and other parts showed practically no wear and the entire lubrication system was clean and functioning with maximum efficiency. Recommended for all steam turbine lubrication and as the medium in hydraulic units. Comes in four grades: 9, 11, 15, 19.

A. Has excellent metal-wetting ability — resists the heaviest bearing and gear loads and assures constant lubrication.

B. Contains a highly effective oxidation inhibitor — prevents the formation of lacquer, gum, and sludge deposits on parts and in oil and hydraulic systems.

C. Corrosion inhibitor stops rusting — Calol OC Turbine Oil in both salt and fresh water tests kept steel strips from rusting while they were immersed in the water-oil mixtures for 48 hours.

Case 1140—Meeting All Steam Engine Lubrication Conditions



STEAM ENGINE CYLINDER AND VALVE

In a group of steam engines of various types, Calol Cylinder Oils provided maximum lubrication efficiency in each one. The long list in this line includes oils with the special combination of properties to meet all different conditions of steam engine pressure, temperature and moisture. In addition, each has several general attributes that assure economical operation.

A. Good adhesion to surfaces reduces wear, prevents dry spots, scoring, and minimizes corrosion.

B. Minimum carbon formation—assured by use of selected oil stocks of proper characteristics.

C. Proper atomization and good dispersion of oil in steam—provided by correct viscosities.

To further meet various conditions, each Calol Cylinder Oil is suitable for use in a considerable range of steam temperatures and steam pressures and several choices are provided for each basic type of service.

Trademark Reg. U. S. Pat. Office

STANDARD TECHNICAL SERVICE will make your maintenance job easier. If you have a lubrication or fuel problem, your Standard Fuel and Lubricant Engineer or Representative will gladly give you expert help; or write Standard of California, 225 Bush St., San Francisco 20, California.

CALOL

FOR EVERY NEED A **STANDARD OF CALIFORNIA** JOB-PROVED PRODUCT

OHIO BRASS COMPANY
BARBERTON DIVISION · BARBERTON, OHIO, U. S. A.
TO: PACIFIC ELECTRIC MFG. COMPANY
FOR: PUGET SOUND POWER & LIGHT CO.

Of the many O-B Bushing installations in the west, this is an outstanding one; located in the Renton Station of Puget Sound Power & Light Company at Seattle, Washington. Builder of the breakers, the Pacific Electric Manufacturing Company, states . . . "Rating, 115 kv, 800 amp., 1,500,000 interrupting kva, 5-cycle trip, 20-cycle reclose. Mechanical stress on bushings is avoided by use of sliding-shoe contacts. These require no critical adjustment to fix closed position, nor is contact pressure affected by wear. Other Pacific features include closing by stored energy of motor-compressed springs, expulsion-chamber arc extinguishment." And . . .

BUSHINGS ONE OF THE FINEST COMPONENTS OF *ANY* CIRCUIT BREAKER . . . . .

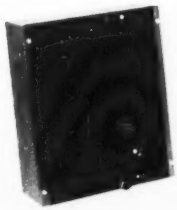
Ohio Brass MANSFIELD, OHIO

2988-H

Square D
Low Voltage Control
outstanding 1/ 2/ 3/ ways

1/ The Master Control Contactor with 23 points of control offers complete master control economically. Master Control switching stations may be installed at any number of convenient locations. The contactor consists of 2 contacting disks—one for the control of the "ON" coil circuits, the other for the control of the "OFF" coil circuits of the low voltage relays.
Square D, utilizing the 3 wire system, assures positive OFF and ON switching.

2/ The Selector Switch consists of a multi-pole, rotating type switch mounted on a single-gang switch plate, and includes one single-station, lever operated, ON and OFF switch. The rotating member is a 2-circuit, 9-station, manually operated device, and can be used for master control as well as selective control.



Illustrated without cover

3/ The Relay Ganging Box is designed to accommodate 12 relays. It is provided with a metal barrier imbedded in rubber which isolates the high voltage side of the relay from the low voltage side. The use of the relay ganging box will result in more silent operation. It may be installed in any convenient location.

SQUARE D COMPANY
DETROIT • MILWAUKEE • LOS ANGELES
SQUARE D COMPANY CANADA LTD., TORONTO • SQUARE D de MEXICO, S. A., MEXICO CITY, D.F.

BUILDING LIGHTING LOAD FOR YOU! With a great

G.E.'s BIG ANTI-DRIVE - SEPT

NATIONWIDE CAMPAIGN WILL PRE-SELL YOUR CUSTOMERS

Millions of customer impressions will be created by all these ads in Life, Oct. 17, This Week, Oct. 2; Look, Oct. 25; Parade, Sept. 11, Oct. 30; American Weekly, Sept. 18, Oct. 30; Post, Oct. 8. And watch for lamp-selling messages on the Fred Waring Show every Sunday night on CBS television.

GE LAMPS

Stock up! Tie in! Cash in!

promotion of the greatest lamp-selling theme of all!

BULBSNATCHING

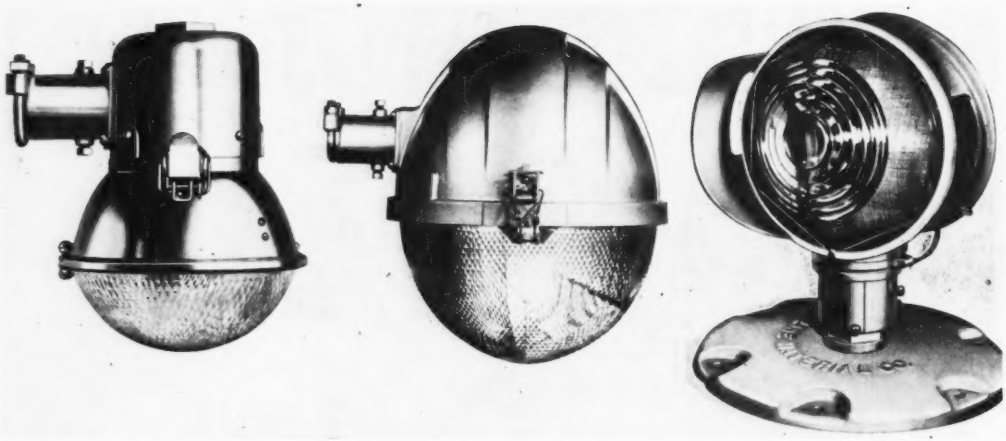
19 TO OCT 31

SPECIAL DISPLAYS HELP DEALERS TIE IN

These are the colorful, hard-selling displays now in the stores of G-E lamp agents everywhere. Featuring the famous G-E 4-lamp package, they're designed to build wider use of higher wattage bulbs, fill empty sockets throughout your area. Your lighting load will get a big boost from "BULBSNATCHING"—greatest lamp-selling theme of all!

GENERAL ELECTRIC

PRODUCT NEWS



L-M Spherolite Jr., left, Vertolite mercury-vapor unit, center; the fixed-focus runway marker light is shown at the right

Manufacturer Brings Out New Street and Airport Lights

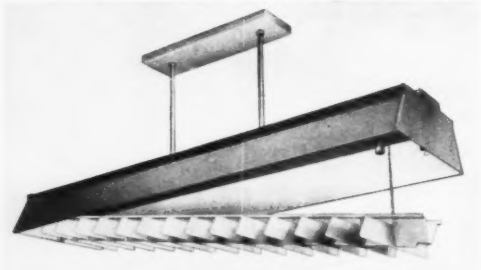
(900-903) Line Material Co., Milwaukee 1, Wis.

New items in the L-M line include two street lighting and one runway marker units. The Spherolite Jr. (900) at left above is a small, shielded light source type unit intended primarily for residential lighting where narrow streets and wide spacings usually prevail. It is said to gain its effectiveness by producing a high concentration of light in the main zone where the maximum intensity is approximately eight times the bare lamp value. Angle of the main beam is at 78° in the vertical with approximately half the maximum value directed at the 85° angle. Two types of light distribution are provided—IES type II for mounting at right angles to the curb lines and the offset 4-way, with normal application a diagonal mounting on mast arms at right-angle street intersections.

The Vertolite mercury-vapor luminaire (901) at center is said to combine efficiency with low operating cost; operates with lamp in a vertical position. It is offered for slipfitter mounting on $1\frac{1}{4}$- or 2-in. mounting brackets; uses either FH-1, 16,000-lumen or EH-1, 21,000-lumen mercury-vapor lamps; available for IES type III or IV light distributions.

The L-M fixed-focus bidirectional high-intensity runway marker light (902) meets CAA specification L-819; is the same unit as manufactured for the armed forces to specification M-2.

Miller Berkeley, showing louver drop down arrangement



Light Designed for Schools

(904) The Miller Co., Meriden, Conn.

The all-metal Berkeley F luminaire shown left below was designed for schools, stores and offices. Predominant downward light distribution is shielded 40° crosswise and 30° lengthwise. Approximately 43° of the total output is directed upward to minimize contrast. If no upward light is wanted, baffles may be attached to top of reflector. The louver assembly drops down on a chain for access to wiring channel. The Berkeley uses two 40-watt, general-line F lamps.

Wiring Trough Improved

(905) Stone Mfg. Co., Elizabeth, N. J.

Used for multiple mounting of Par 38 and R 40 lamp holders, the improved model 10 trough incorporates side mounting in addition to bottom mounting. It is now possible to mount eight lamp holders in the $\frac{1}{2}$-in. hole size, the manufacturer states. Mounting holes are available in clean IPS sizes $\frac{3}{8}$ and $\frac{1}{2}$ in. UL approved.

LOUVERLITE

SLIMLINE

by Smithcraft

A PROGRESSIVE DEVELOPMENT IN LOUVERED LIGHTING

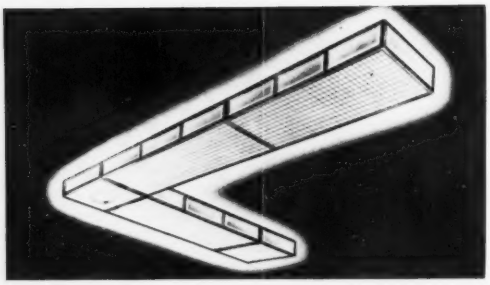
A FOLDER "LOUVERLITE SLIMLINE" IS AVAILABLE UPON REQUEST. WRITE FOR YOUR COPY TODAY!

Smithcraft
LIGHTING DIVISION
CHELSEA 50, MASSACHUSETTS

Louverlite Slimline, truly a progressive development in louvered lighting, utilizes the Smithcraft "area-of-light source" principle to create an extremely shallow and unobtrusive fixture. Designed for two or four T-12 or T-8 96" Slimline lamps, Louverlite Slimline provides an excellent downward component of glare-free light, with an effective louver cut-off of 30° crosswise, 30° lengthwise.

Louverlite Slimline may be mounted surface or pendant, individually or continuous row. Installation and maintenance are effectively simplified. The rigid louver is held by Smithcraft Duo-Cam hangers, and relamping can be easily accomplished by finger-tip release of the louver, from a single position. For servicing, the louver hinges from either side and can be removed without involving tools or loose parts.

Louverlite Slimline is a notable achievement in the design of fluorescent lighting elements . . . a proud addition to the Smithcraft line of "America's finest fluorescent fixtures".



Module permits pattern arrangements; mixes light sources

Modular Principle Applied to Lighting

(906) Mitchell Mfg. Co., 2525 Clybourn Ave., Chicago, Ill.

Basically this new system consists of four modules or units, all having a single or multiple standard of $16\frac{1}{4}$ in. These units can be put together in many combinations to fit different commercial lighting needs, and are in effect building blocks that may be used in 90° patterns, as well as individually or in continuous rows. Module A is $16\frac{1}{4}$x $16\frac{1}{4}$; uses four 14-watt, T-12, 15-in. type F lamps. Module B is same size; uses one 32-watt, 12-in. diameter Circline lamp and one Par 38SP spot or one Par 38FL lamp. Module C is $48\frac{3}{4}$x$10\frac{1}{4}$; uses four 40-watt, T-12, 48-in. type F lamps. Module D is $97\frac{1}{2}$x$16\frac{1}{4}$; uses four 75-watt, T-12, 425 milliamp Slimline lamps.

Fluorescent Street Light Developed

(907) General Electric Co., Schenectady 5, N. Y.

A fluorescent street light developed by General Electric is said to give a softly diffused, virtually glare-free light. It was developed for use by public utilities for public demonstrations. It is a cigar-shaped aluminum tube in which are mounted two pairs of 8-ft.-long fluorescent lamps. Two long, highly polished reflectors, mounted back to back, direct light from the lamps through clear plastic windows to the pavement. Almost two years of research have gone into the product and, according to G-E engineers, major problems still to be solved are almost entirely economic.

New Lights for Merchandising

(908-910) Curtis Lighting Inc., 6135 W. 65th St., Chicago 38, Ill.

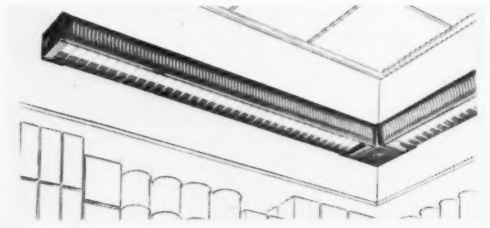
Designed for merchandising, three new Curtis lighting products are:

"Store-Liter" (908), a steel and plastic luminaire using two T-12, 96-in. F Slimline lamps.

"Wall-Strip" (909), a decorative wall light for one 40-watt, T-12 F lamp. It can be installed on walls at various mounting heights to give a wash of white or colored light above and below the luminaire. A corner box joins the strip at corners.

"Punchy" (910) spots merchandising displays. It is a recessed unit designed for use with one PAR-38, 150-watt projector flood or spot lamp. Adjustment is possible to any angle 0° to 35° from the vertical and 0° to 360° from the horizontal.

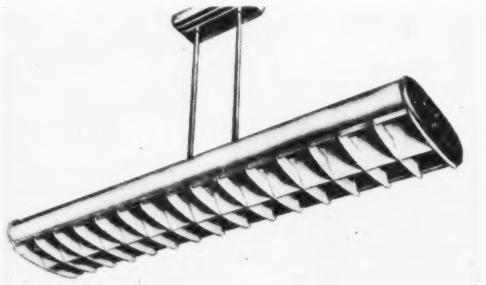
Curtis Wall Strip is for one 40-watt, T-12 fluorescent



F Fixture for Commercial Use

(911) Sylvania Electric Products, 500 Fifth Ave., New York 18, N. Y.

Combining high output of indirect light with easy maintenance, this CL-242 is a 2-lamp, 40-watt unit with bottom louver and luminous plastic side panels. Because there are no joining bands or end caps, individual units may be joined so closely that dark areas between fixtures are eliminated, the manufacturer states. When pendant mounted,



Sylvania CL-242, 2-lamp, 40-watt unit for commercial use

the unit is claimed to have an over-all efficiency of 85.5%, with 55% of output upward. Plastic side panels sit in holding tabs in the end plates.

Fixture for Slimline Lamps

(912) Smithcraft Lighting Division, Chelsea 50, Mass.

The Director is a louvered F luminaire for 96-in., T-12 or T-8 instant-start Slimline lamps and is said to give a large area of light source without imposing dominance on the eyes. Comes for 2, 3, 4 or 6 8-ft. Slimline lamps and in matching units for 2, 3, 4 and 6 40-watt, T-12 F lamps. The louver provides a cutoff of 35° lengthwise, 25° crosswise; is partially released from one end for relamping.

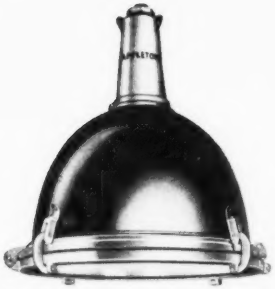
Recessed Reflector Has Many Uses

(913) The Edwin F. Guth Co., St. Louis 3, Mo.

"Top Hats," recessed reflectors for R-40 lamps, may be used for supplementary incandescent lighting and for unusual architectural treatments. According to the manufacturer, they may be used with sun lamps in the home.

Guth also announced recently availability of its Guthlite Jr. in a 4-light size, and of its Trucolite reflector in a new model for Slimline lamps.

MORE FOR EVERY LIGHTING DOLLAR!



Industrialite High Mounting Fixture
For use in railroad yards and round houses, steel mills, foundries—hundreds of industrial installations.

Seprable Standard Dome Reflector
Hood is easily detached for cleaning or servicing without disconnecting wires. Weatherproof.

Diffuso Floodlight
For even illumination of service stations, athletic fields, tennis courts, parking spaces, etc. Available for Pole, Bracket or Cross arm mounting.

Type EVX Explosion-Proof Fixture
Ruggedly built of tough, malleable Iron, this Fixture provides safe, superior illumination for hazardous locations.

APPLETON LIGHTING EQUIPMENT

Appleton Lighting Equipment is scientifically designed to provide maximum lighting efficiency at minimum installation, service and operating expense.

The manufacture of Appleton Fixtures is quality controlled from raw materials to finished product. Metal parts of reflector are made of pure ingot iron—tough, long-wearing metal that is ruggedly corrosion-resistant. Vitreous-fired porcelain enamel finish provides maximum reflecting efficiency.

Including hundreds of types and sizes, the Appleton Line contains a fixture to fit virtually every lighting requirement, whether indoors or out. Sectionalized construction of all types assures quick, easy servicing. Get the most from your lighting dollar. Specify Appleton, STANDARD FOR BETTER LIGHTING.

Type EFU Explosion-Proof Fixture
Up-to-the-minute version of the first Fluorescent Lighting Fixture ever to be developed. Can be hung horizontally or at 45-degree angle.

Write for complete Catalog information.

SOLD THROUGH ELECTRICAL WHOLESALERS

APPLETON ELECTRIC COMPANY

1709 WELLINGTON AVENUE • CHICAGO 13, ILLINOIS

LOS ANGELES 12, 100 N. Santa Fe Ave.
SAN FRANCISCO 1, 655 Minna Street
SEATTLE 9, 115 Ray Street
DENVER 2, 1921 Blake Street

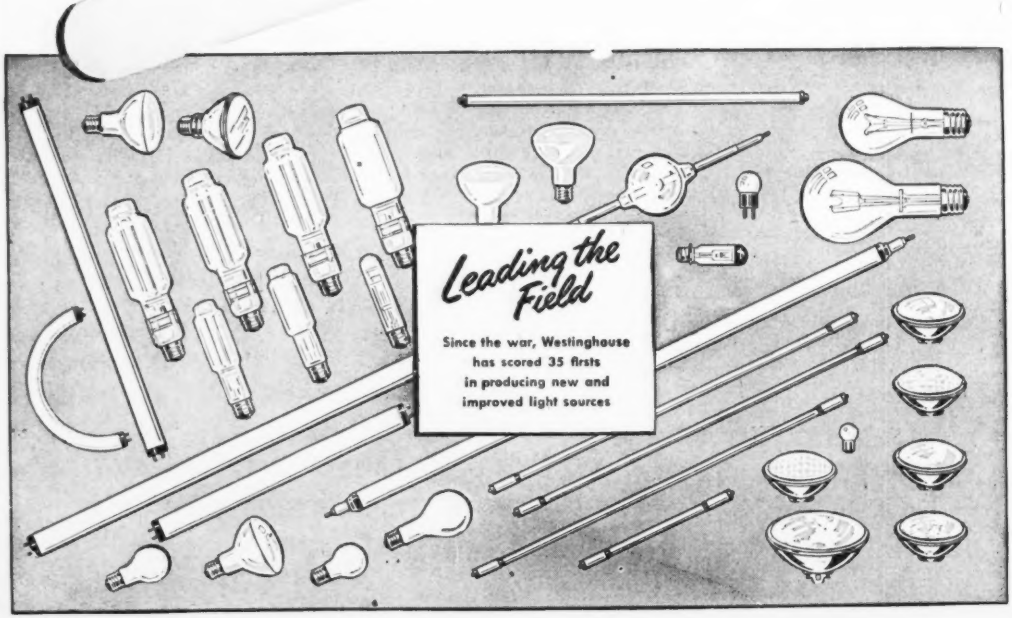
APPLETON

CONDUIT FITTINGS • LIGHTING EQUIPMENT • OUTLET AND SWITCH BOXES • EXPLOSION-PROOF FITTINGS • REELITES

Westinghouse

Fluorescent Lamps

NOW LAST 3



TIMES AS LONG!

...YET COST NO MORE!

SAVE 2/3

SAVE THIS — one lamp now lasts as long as 3.

LAMP COSTS

TIME SPENT REPLACING BURNED OUT LAMPS

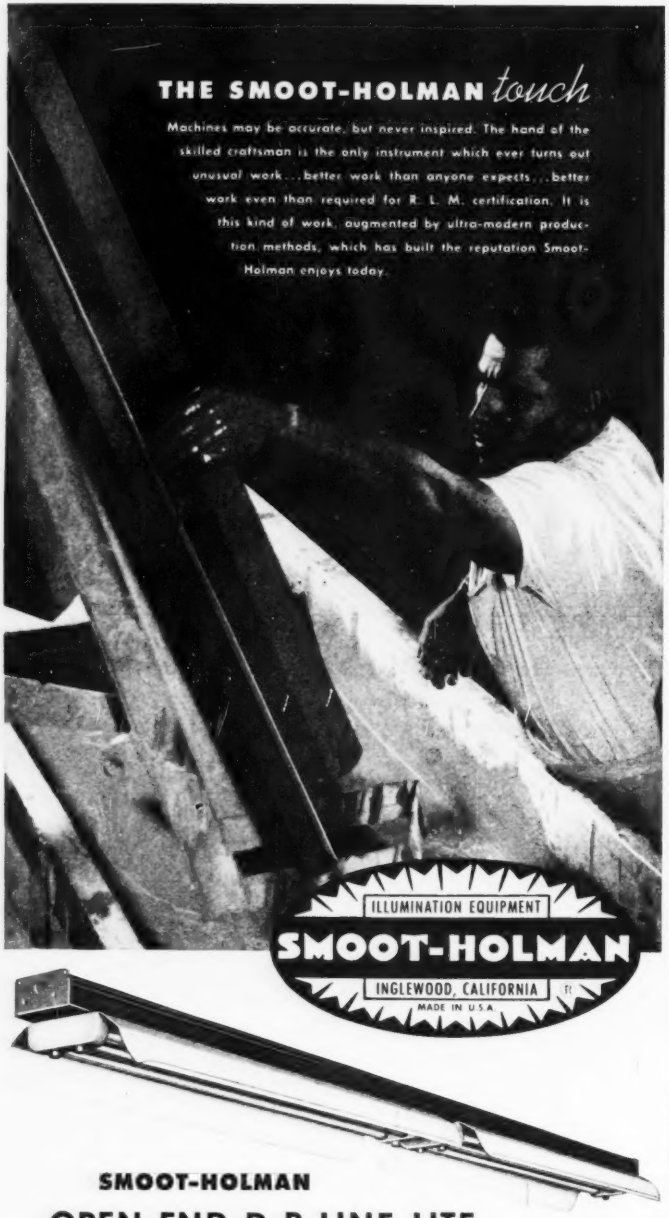
SAVE THIS — lamps need be replaced only ⅓ as often.

Now Westinghouse fluorescent lamps will last 2½ years in average store installations . . . 3 years in average one-shift office or factory installations.

This amazing increase in life was engineered into Westinghouse fluorescent lamps many months ago. Since then they have been under strenuous life tests —tests that cannot be hurried. Now the results are in and they prove that Westinghouse lamps last three times as long as before! Lamp Division, Westinghouse Electric Corporation, Bloomfield, New Jersey.

YOU CAN BE SURE...IF IT'S

Westinghouse

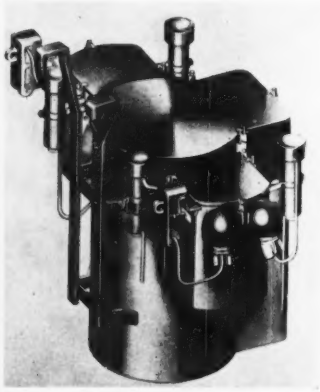

THE SMOOT-HOLMAN touch
Machines may be accurate, but never inspired. The hand of the skilled craftsman is the only instrument which ever turns out unusual work... better work than anyone expects... better work even than required for R. L. M. certification. It is this kind of work, augmented by ultra-modern production methods, which has built the reputation Smoot-Holman enjoys today.
ILLUMINATION EQUIPMENT
SMOOT-HOLMAN
INGLEWOOD, CALIFORNIA
MADE IN U.S.A.

SMOOT-HOLMAN

OPEN-END D-P LINE-LITE

An IndustroLux fluorescent luminaire designed for continuous mounting. For two or three 40-watt lamps, featuring depressible plungers for easy installation and removal. Supplied for 110/125 volt 60-cycle A. C. operation.

Offices in Principal Western Cities • Branch and Warehouse in San Francisco



(914) An outdoor substation-type constant current regulator for street lighting (above) introduced by G-E is available in ratings of 20, 25, and 30 kw. It has all of its components wired at the factory. In the field it is necessary only to bolt it on the pole or platform and connect the power and control leads.

(915) This new plastic outlet box cover and switch housing (above) is suitable for individual control of lights or power units and control of banks of lights up to 1,250 volts. Offered by McGill Mfg. Co., Valparaiso, Ind.

(916) ADJUSTABLE RECESSED LIGHT FIXTURE—Features and advantages of conventional recessed fixture are combined with adjustable torpedo-type spot light. Swivelier Co., 90 Irving Place, New York, N. Y.

(917) SWIVEL SOCKET—Screws into any fixed-ceiling socket to make it adjustable in any direction. Accommodates any light bulb or reflector lamp that has medium base. Capacity, 660 watts, 250 volts. Amplex Corp., 111 Water St., Brooklyn, N. Y.

(918) ALL-STEEL LOUVERED FIXTURE—Available for two 40-watt, T-12 lamps; has distribution of 40% upward and 60% downward. The Frink Corp., 27-01 Bridge Plaza N., Long Island City, N. Y.

Curtis LIGHTING

engineered and designed FOR SELLING

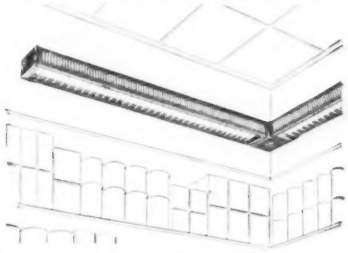
That's the story that answers the trade's demand for increased sales. Sell "Lighting Engineered and Designed for Selling" to get a complete retail store installation . . . your assurance of customer satisfaction. It's a story backed by over fifty years of leadership in the lighting field.

Each of these Curtis units fulfills one of the four major requirements of retail store lighting . . . ATTENTION . . . INTEREST . . . DESIRE . . . ACTION.

Get your share of this tremendous market with Curtis . . . "Lighting Engineered and Designed for Selling" . . . selling for you and your customers.

"Store-Liter"

Utilizing the new 75-watt, T-12, 96-inch fluorescent lamp. Features instant starting . . . more lumens per foot of lamp . . . 96-inches of uninterrupted light per luminaire. For general store illumination, it literally "washes the walls with light".



"X-Ray"

Silver-mirrored show-window reflectors for incandescent lamps. Three types: distributing, semi-concentrating, and concentrating. Creates "Attraction-Zone" lighting. Attracts more customers to merchandise displays.

"Punchy"

Utilizing one side-prong PAR-38, 150-watt projector flood or spot lamp. Adjustable from the floor to any angle 0° to 35° from vertical and 0° to 360° horizontal. Puts lighting emphasis where it is wanted.

"Wall-Strip"

Utilizing one 40-watt, T-12, 48-inch fluorescent lamp. Illuminates shelves, wall cases, etc., also directs some of its output to the ceiling where it is diffused into the sales area. Mounts to wall as individual unit or continuous run.

CURTIS LIGHTING, INC.
6135 WEST 65th STREET, CHICAGO 38, ILLINOIS
CHICAGO . . TORONTO . . NEW YORK

THE MAGNO-TRONIC FLUORESCENT STARTER

PROTECTS Fully automatic thermal relay with unusually long life that eliminates blinking lights and protects all auxiliary equipment.

SIMPLIFIES Replacement of worn-out lamp automatically restores closed circuit—replacement of starter unnecessary. No button to push.

REDUCES COSTS Magno-Tronic starters provide exact timing in the lamp electrode—preheating process preventing excessive loss of emission material thereby assuring the maximum in the useful life of a lamp. The established quality of this starter saves considerable time in maintenance and man hours required to repair and/or replace an inoperative lighting unit.

VERSATILE Will operate efficiently over an extended voltage under widely varying temperatures.

GUARANTEED FOR ONE YEAR

The (SP-15-20) for use with either 15 or 20 watt lamps
The (SP-30-40) for use with either 30 or 40 watt lamps
The (SP-100) for use with 100 watt lamps

Ask for descriptive literature

INDUSTRIAL ELECTRONICS CORP.

MAIN PLANT Newark 2, N. J.

Feature Devices from the KULKA Line

The KULKA SWIVEL-SOCKET *Spot-liter*

No. 168
With 6 ft. cord
Fully wired
Ready to plug-in
660 W-250 V

Used with Spotlight or Floodlight Bulbs up to 300 Watts

DIE CAST BASE WITH ATTRACTIVE STATUARY BRONZE FINISH

—Has Convenience Outlet

A thoroughly engineered, yet handsome appliance. Adjustable to full 90° in ONE OPERATION. The unit is lightweight, yet sturdy—and so steady it won't tip over. Has convenience outlet in base to permit banking without junction blocks and cords. Also has bayonet lock in base to allow use as a pin-up lamp. Ideal lamp for show windows, etc., but also makes fine "sun lamp" or "infra red" lamp for home use.

Write for Circular, or Catalogue of Complete Line

KULKA ELECTRIC MFG. CO.
30 SOUTH ST., MT. VERNON, N. Y.

(919) ANGLE-LIGHT—A fluorescent fixture designed to fit into any right-angled corner, vertically or horizontally. Available for pin-up or permanent mounting for one or two tubes in sizes ranging from 14 to 40 watts. Winfield Electric Co., 1844 N. Ada St., Chicago 22, Ill.

(920) REFLECTOR FLOOD—A new 300-watt, R-40 bulb, special-service reflector flood lamp with a mogul screw base is an extension of the Westinghouse line of heat-resistant glass bulb lamps. It is rated at 115, 120 or 125 volts; has a maximum over-all length of 7¼-in. Average life rating is 1,000 hours. Westinghouse Lamp Division, Bloomfield, N.J.

(921) INTERIOR COATING—A fine silica inside coating for frosted bulbs increases light absorption by 3% but is said to give same amount of light as other frosted lamps. Advantages claimed are greater diffusion and cleaner, whiter appearance. Application process by Champion; silica is produced by Monsanto Chemical Co., St. Louis 4, Mo.

(922) COMBINATION FIXTURE—Primarily for the kitchen, the Dualite has a standard 12-in. diameter, 32-watt Circline fluorescent lamp in combination with a 100-watt silver bowl incandescent. Guardian Light Co., 301 Lake St., Oak Park, Ill.

(923) SOCKET CLAMP—Designed for use with all standard medium-base sockets, this clamp consists of two identically formed rings of heavy-gage steel. One ring fits over the socket cap, the other slides over the shell until it rests on the shoulder; two screws clamp the rings together. Vimco Mfg. Co., 109 Brayton St., Buffalo 13, N. Y.

(924) BAKELITE RECEPTACLES—Ceiling and outlet box receptacles are available in 3¼- and 4-in. sizes in keyless and pull-chain styles. Eagle Electric Mfg. Co., 23-10 Bridge Plaza S., Long Island City 1, N. Y.

(925) REACTORLESS FLUORESCENT—Incorporates within the glass tube a special resistance said to eliminate need for external ballasting. Solar Electric Corp., Warren, Pa.

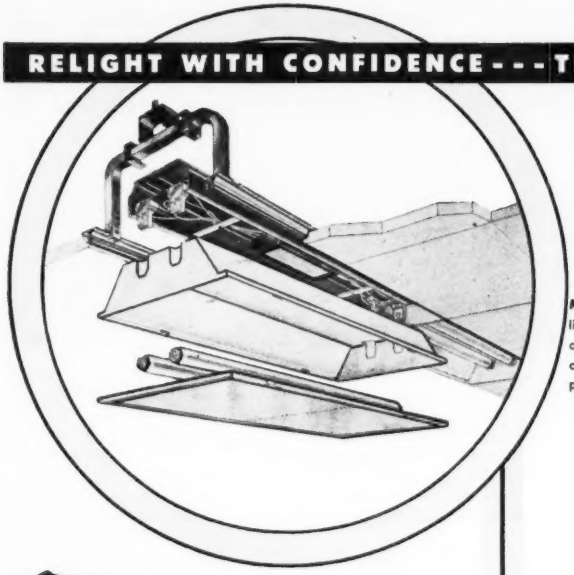
(926) BALLAST—A small cross-section type ballast for 240-watt fluorescent lamps is claimed to be quiet in operation and to have advantages in design of compact fixtures. Advance Transformer Co., 1122 W. Catalpa Ave., Chicago, Ill.

(927) EMERGENCY LIGHT—The All-in-Head emergency light is said to illuminate a room 30x30. It is 6 in. in diameter and 6 in. deep. Carpenter Mfg. Co., Boston 45, Mass.

(928) SLIMLINE LAMPS—New F tubes include Slimlines in 1½-in. diameter, 4- and 6-ft. lengths. These are companions to the 8-ft. 1½-in. tube, and may be operated at the same brightness level as the 96-in. lamp. General Electric Lamp Department, Nela Park, Cleveland, Ohio.

(929) CEILING FIXTURE—Three Circlate 18-watt bulbs are incorporated in a new fixture designed by Homecraft Electronic Products, 1208 S. Kedzie Ave., Chicago 23, Ill.

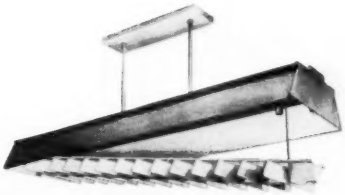
RELIGHT WITH CONFIDENCE---THE PROVEN MILLER WAY



MILLER SINCE 1844

MILLER CONTINUOUS WIREWAY FLUORESCENT TROFFER lighting systems offer all of the many Miller advantages, plus new architectural aids, new possibilities in esthetic design, new architectural and structural versatility, and new installation simplicity. They are particularly adapted to office, store and school lighting.

MILLER CONTINUOUS WIREWAY FLUORESCENT industrial lighting systems offer many important advantages. They provide best seeing light at lower cost, have modern appearance, lower cost of installation, reductions in wiring material, simplified maintenance, and many special construction features for industrial installations.



MILLER ALL-METAL FLUORESCENT LUMINAIRES for schools and general commercial lighting are built in strict accordance with Miller's century-old standards of quality construction, simplicity of installation and servicing. Designed particularly for the better lighting of schools, where exact seeing is of utmost importance, they provide excellent illumination in stores, offices, and general commercial interiors.

MILLER SERIES—LOUVER SLIMLINE LUMINAIRES for commercial and industrial interiors are designed for use with the 96-inch Slimline fluorescent lamp, and are a semi-direct type with predominant downward component of light but with sufficient light to eliminate undesired contrast between luminaires and ceiling. They are the latest addition to a comprehensive line of lighting equipment covering the needs of planned industrial and commercial lighting and the use of current light sources.

MILLER HARTFORD LUMINAIRE, for individual and continuous row lighting, is available for use with general line and Slimline fluorescent lamps. A choice of three types of hinged door enclosures (metal louver, polystyrene lens, Lucite Diamond lens) assures well diffused illumination ample in quality and quantity. Combines good taste with lighting efficiency ... can be close-ceiling mounted or suspension mounted individually or in continuous rows ... flanged channel top simplifies installation ... connector strap joins one channel section to another.

A complete stock of Miller products is carried in all GESCO offices and warehouses in the Pacific Coast territory. They are among the many famous name brands carried by General Electric Supply Corporation, assuring you the finest materials obtainable.

GENERAL ELECTRIC SUPPLY CORPORATION

SAN FRANCISCO • OAKLAND • SACRAMENTO • FRESNO • LOS ANGELES
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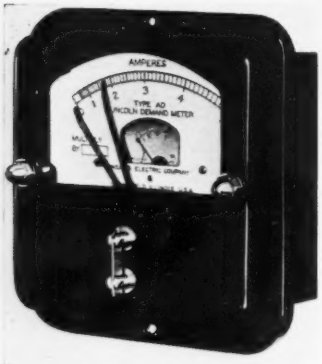
Thermal Demand Meter

(930) Sangamo Electric Co., Springfield, Ill.

Designed for semi-flush mounting on electric power switchboards, these new thermal ampere demand meters are designated as Lincoln type AD-2. They are equipped with two demand indicating pointers, one attached to the actuating element and continually showing the demand on the feeder phase; the other a friction, or idle, pointer, to indicate the maximum demand by remaining at the highest point to which it is pushed by the first pointer. The friction pointer has a silicone grease damping clutch that permits free motion when being pushed, but prevents motion from shock or excessive vibration.



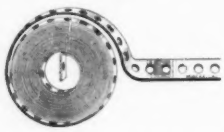
These meters can be supplied with an instantaneous indicator to give immediate indication that load has been picked up after the feeder switch is closed. They also can be furnished with a self-contained reactor for protection on surge currents 100 times normal load rating. They are supplied with either 3-, 5- or 6-amp. full-scale ratings and are said to impose a very small non-inductive burden. Dials reading directly in transformer primary amperes are available when required.

Pipe Straps

(931, 932) Minerallac Electric Co., 25 N. Peoria St., Chicago, Ill.

Zinc-plated 2-hole straps (931) for use on loads too heavy for the 1-hole clip are plated to give maximum protection against corrosion and are designed for accurate fit, according to the manufacturer. The strap itself rests flat on the supporting surface, holding pipe or conduit firmly in place.

(933) The new Kearney Hi-Line tool trailer has a 67-in. over-all body width; is said to increase storage capacity by 40%. Use of a vertical-lift lid opening mechanism allows more tools to be carried on easily reached side racks. The greater width helps to accommodate large items. Top tilts in open position to allow easy access to either side. Cushion rubber seal at opening forms watertight compartment. The top is of reinforced steel. A built-in heater keeps tools dry. Trailers available either with electric or vacuum brakes or without brakes from the James R. Kearney Corp., 4236 Clayton Ave., St. Louis 10, Missouri

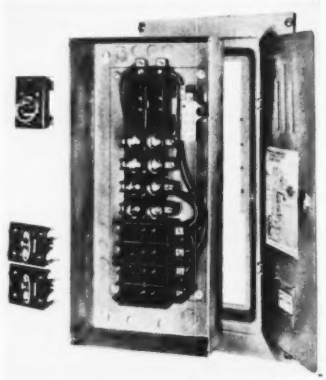


A perforated strap (932) for cable, conduit pipe, etc., is claimed to handle a safe load up to 500 lb. It is made from electro-galvanized steel, $\frac{3}{4}$ in. wide and precision formed. Perforations are $\frac{1}{4}$-in. holes on $\frac{1}{2}$-in. centers. Strap available in 10-ft. coils or other lengths on request.

Insulating Film

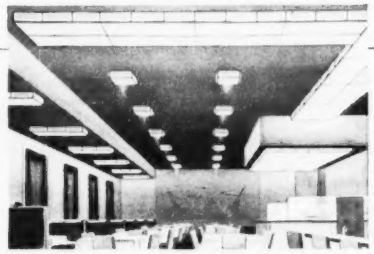
(934) Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.

A new electrical insulating film for coils is applied like tape and heat treated to bond itself into a unified layer of insulation. Comes in 60-yd. rolls in widths up to 42 in. and thicknesses of 2, 4, 6 and 8 mils. It is not sticky to touch. Dielectric strength varies with degree of heat cure, ranging up to more than 1,750 volts per mil of thickness. Trademarked "Scotch-Weld" electrical insulating film No. 70.



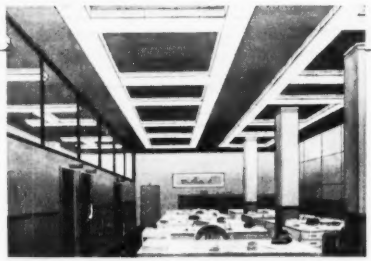
(935) This dead front triple pullout combination service entrance switch and panel was designed for minimum on-the-job wiring for electric range and water heater; also has commercial and industrial applications as feeder panel. Unit has 100-amp. main lugs feeding 60-amp. pullout switch, which energizes from four to twelve lighting circuits. Branch circuit block will take non-tamperable fuses. The two appliance pullouts are internally wired in parallel with the main lugs and come for either 30 or 60 amp. General Switch Corp., 49 Roebling St., Brooklyn, N.Y.

☆ makes possible limitless pattern designs



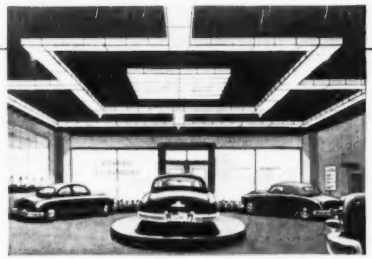
☆ custom-fits any room shape or proportions

the revolutionary
new idea in lighting



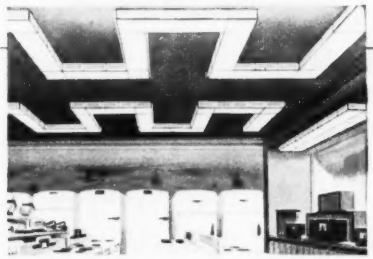
☆ provides unlimited linear flexibility

MITCHELL
module
REG. U.S. PAT. OFFICE

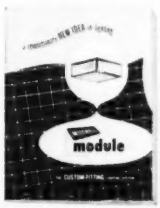


☆ mixes many light sources in one uniform system

the **custom-fitting**
lighting system



☆ features equal low brightness throughout



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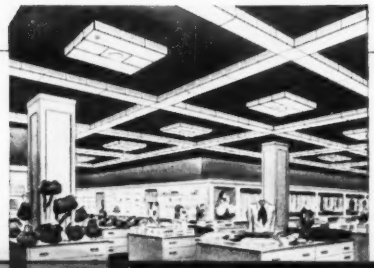

☆ provides harmonious matched appearance throughout

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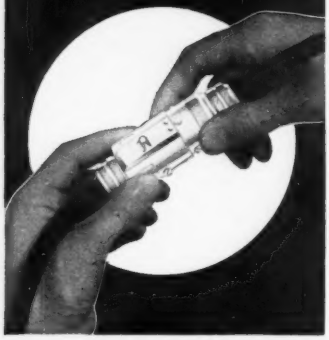

Interchangeable and reversible contact units

2 pole 3 pole 4 pole

Compact, Heavy Duty Plugs and Receptacles

Midget Triploc plugs and receptacles are ideal for use with a great variety of portable electrical equipment where operating conditions are severe. Interchangeable 2, 3, or 4 pole contact units permit many different types of assembled combinations. The protected female contacts may be assembled in either plug shell or receptacle housing for protection in line side of circuit. Automatic Bayonet lock is simple and effective; polarity is maintained and correct insertion of plug assured by keyed housings and unequal spacing of contacts. Ground protection is provided when required. Rating 10A., 250V., 15A., 125V. Consult your Pylet Catalog 1100, Bul. 1140-1, page 19, for complete listings.

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SINCE 1897

THE PYLE-NATIONAL COMPANY

1364 N. Kostner Ave., Chicago 51, Ill.

Pacific Coast Sales Office
25 Beale Street, San Francisco 6, Calif.

BULLETINS ETC.

(936) FIXTURE—In a 12-page catalog folder, Miller describes its new Hartford luminous downlight luminaire, available with three types of hinged-door enclosures. Available from The Miller Co., Meriden, Conn.

(937) F LINE—A new 74-page catalog covering its complete line of fluorescent lighting fixtures has been published by Sylvania Electric Products, Inc., 500 Fifth Ave., New York 18, N. Y.

(938) FARM ELECTRIFICATION — Information on application of motors and controls to specific farm operations is contained in a 15-page booklet published by Westinghouse, Box 868, Pittsburgh 30, Pa. Briefly discussed are advantages of electrical farm power and basic functions of the portable motor and motor controls.

(939) EXPLOSION - PROOF EQUIPMENT — An illustrated publication catalogues explosion-proof electrical fittings and equipment for use in hospital surgeries and anaesthesia rooms. Gives data on design, installation of hospital wiring equipment. Available from Appleton Electric Co., Department HE, 1701 Wellington Ave., Chicago 13, Ill., under title "Hospital Bulletin No. 1051."

(940) INSULATORS — Low-voltage pin-type insulators are described in a folder from Ohio Brass, Mansfield, Ohio.

(941) GENERATORS—A-C generators ranging in capacities of 5 to 175 kw. at 60 cycles; speeds from 720 to 1,800 r.p.m. are described in Bulletin No. 3149 published by Kato Engineering Co., 1415 First Ave., Mankato, Minn.

(942) POWER FUSING—Time-current information for power fuse coordination is contained in 60 pages of curve sheets and engineering notes available from S&C Electric Co., 4425 Ravenswood Ave., Chicago 40, Ill.

(943) TRANSMISSION BELTING—A 28-page catalog giving design, engineering and performance data on belts is offered by United States Rubber Co, Rockefeller Center, New York 20, N. Y.

(944) MANUAL STARTERS — The new TT manual starter, providing overload protection for small motors up to 1 hp., is described in a bulletin from Trumbull Electric Mfg. Co., Plainville, Conn.

(945) CABLE—A data book on Kaiser aluminum ACSR and all-aluminum cable is offered by the Permanente Products Co., 1924 Broadway, Oakland, Calif.

(946) NEW PLANT—A series of folders showing its new facilities is being published by Pacific Electric Motor Co., 1009 66th Ave., Oakland, Calif.

(947) PIN-UP LAMPS—A line of pottery lamps is shown in a 4-page folder released by LaSalle Lighting Products, Inc., 143 Seneca St., Buffalo 3, N. Y.

(948) INSULATION—A 96-page manual on 85% magnesia insulation is available to those having a direct interest in industrial heat insulaton from the Magnesia Insulation Manufacturers Assn., 1317 F St., N.W., Washington 4, D. C. Copies of this manual issued will be numbered and numbers registered with the association.

(949) MOTORS—A new catalog of fractional horsepower motors showing all types in NEMA and special mountings is available from Franklin Electric Co., Bluffton, Ind.

ELECTRICAL WEST, 68 Post St., San Francisco 4, California
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CHECK THIS NEW SUNBEAM LUMINAIRE

640 SERIES

The high efficiency (76.5%) and high coefficient of utilization (57%)** of SUNBEAM'S 640 Series makes it ideal for office illumination. It has uniform surface brightness over the glass side panels and the metal egg crate louver provide 37° x 37° shielding. The side panels, rigidly supported in metal frames, swing outward from the bottom for quick relamping and easy maintenance. This unit is available in 3 and 4 lamp 40W fluorescent and 96" slimline and for either ceiling or pendant mounting. The stamped end medallions can easily be removed for joining fixtures in continuous runs. The body and louver is finished in 300° baked white enamel and the exterior is finished in silvertone.

**Based on 75-50 ceiling-wall reflection factor and a room index of "A"

FOR SUNBEAM'S COMPLETE LINE OF ADVANCED LIGHTING FIXTURES SEE YOUR NEAREST LEADING ELECTRICAL DISTRIBUTOR

SUNBEAM LIGHTING COMPANY • 777 EAST 14TH PLACE • LOS ANGELES 21, CALIFORNIA

ELECTRA'S HUSBAND

A LITTLE LIGHT ON DARK WALLS

TURNING the pages of one of the home and garden type of magazines, Electra looked around the room and sighed. "We are overdue for a redecoration around here," she said. "I'm getting awfully tired of these old things and colors. Besides, we're getting dated, not to go along with the trends."

Knowing this to be a no man's land filled with booby traps, I waited for a handhold somewhere before walking in on this subject. To me the place was plenty comfortable and attractive as it was. Why go to a lot of expense—not to say infernal confusion—changing it.

But that is not the answer wanted in a case like that, husbands please be advised. A moment's reflection and, "Just what do you have in mind?"

"Well, I've been noticing in all the magazines recently that the thing to do is to make a bold use of color and pattern."

We each have a vocabulary of our own, mine electrical, hers domestic, and I am familiar with most of the words she uses. But she was either throwing a curve or going esoteric and arty on me, I couldn't tell which.

"Color and pattern," I sparred for time. "Explain a little so I can follow the interesting pathways of your thought."

"Oh, you know, you've looked at these magazines yourself."

"Yes, but what I look for in them is 'How the handy man around home fixes a faucet' or gadgets to get for my workshop. I am afraid those trends and things you mention have escaped me. But then I don't look at those fancy interiors much. Guess it's because I am so well satisfied with what we have now. This is a pretty nice interior, to my way of thinking. You have made it feel real homelike and comfortable to me."

"Thank you, but it is really quite dated. Many of my friends are having their homes done over and I've been wanting to do something myself, but I wasn't just sure what. After all I spend most of my time here."

"True, but of course I live here too, evenings anyway, and I don't see what it needs that it hasn't already."

"I'm just trying to tell you, it needs some color and pattern—"

"Color and pattern? You don't mean, by any chance, some of those dark green walls and blue ceilings, I hope. For if you do, I'm agin it."

"Certainly I mean color in the walls and ceiling and wall papers or drapery with large bold patterns, on one wall perhaps, and the furniture reupholstered in contrasting bold colors. That is the new trend in decor—color, lots of it, boldly used."

This was where engineering and art were going to the mat, I could see, and I did not relish the thought. For some holds are barred to a mere husband that are free style to his wife.

For some time now the women's magazines have been bending over toward the so-called modern design ideas which have appeared first in the World Fairs and then in the expensive stores and the bars and night clubs. The purpose of this "bold use of color and form" is to dramatize the surroundings in order to lift those who enter it into an expansive mood so that they will spend money. Such dramatic atmosphere is functional for that purpose. It was inevitable, I suppose, that the woman who bought a dress in the tinted backgrounds of Macy's or Magnin's and wore it in less stimulated surroundings of home, would think something had slipped with the magic that the dress was supposed to perform on her husband. If he merely told her, as husbands do, that it was a swell dress, but did not kiss her hand and ooh la la as he did so in continental movie manner, there must be something wrong. Maybe it was the living room wall.

Somehow all this excellent reasoning had no appreciable effect on Electra, however. To her it was merely old fashioned if not just ignorant.

"But how are we going to light such a room?" I asked, as one more practical block to this color scheme which already had me seeing red. "You know how dark colors soak up the light."

"Why we'd light the room with modern lamps too, of course."

"You mean those floor lamps with a flat cone top that lets no light get to the ceiling or one of those inverted bullets on the end of a squiggly piece of brass-plated armored cable? Why those things just punch holes in the gloom, they don't give reading or writing or even conversational illumination. The house will look like a cocktail bar, perhaps, but that's not what I want home to be."

For awhile I had thought the Illuminating Engineering Society had made a dent in the home lighting problem. The IES lamp had brought the first real illumination the home had ever had and with the industry back of it and promoting it, home lighting was explained and sold to millions. But the IES, in a flare up of professional self consciousness, thought it was being commercial in lending its good name to a floor or table lamp and pulled out. The lamp makers themselves haven't been able to do much on their own with a CLM program, especially without utility support. And the IES is so busy publishing a commercial magazine with which to talk to itself that it has let slip an educational job directed at the women's and home magazines to let them know that dark walls and ceilings just can't be lighted to bring home comfort.

"But look at these pictures." Electra brought the magazine to prove that such rooms looked well lighted.

"My dear, as a photographer of parts, let me say that a glance at the direction of shadows in the pictures tells me that several big flood lights were used in taking this picture, but in real life the daylight from the windows or the spotlight beams from those wick lamps would give a far different and gloomier effect. Why, not even those gorgeous new dark colors would appear in their true tones.

"*You* are too young, my dear, but *I* am not to remember houses my parents lived in when I was a youngster. There were dark red and dark green walls, or walls papered with large dark-colored patterns then. But those rooms weren't lived in much. We did our real living in the kitchen where it was light enough to see."

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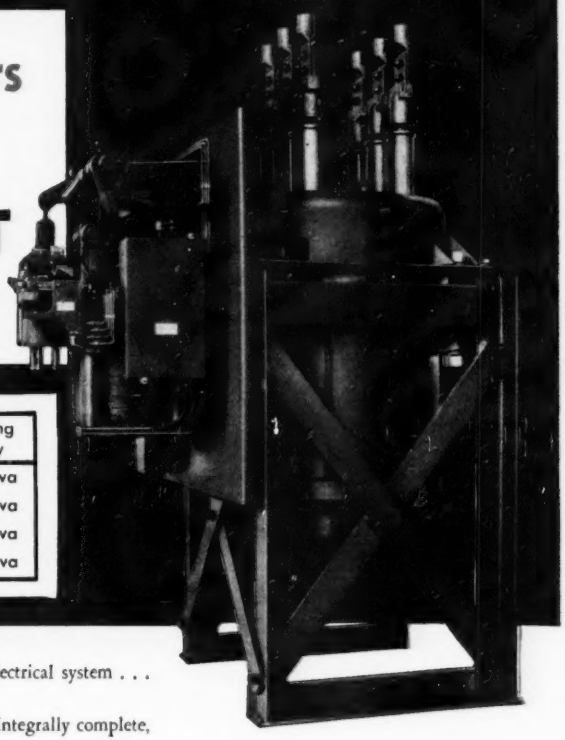
with Allis-Chalmers Type DZ INDOOR OIL CIRCUIT BREAKERS



Type	Rated KV	Interrupting Capacity
DZ-40B	7.2	100,000 kva
DZ-60B	13.8	150,000 kva
DZ-100B	13.8	250,000 kva
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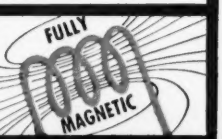

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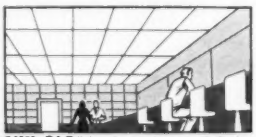

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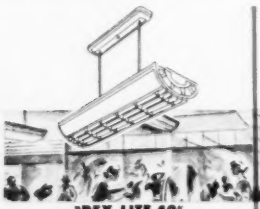

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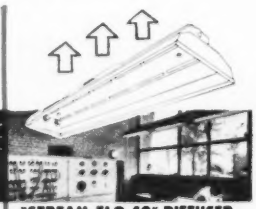
for continuous lines of light



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SEPTEMBER 1949 Vol. 103, No. 3

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED SECTION OF THE U. S.

Not One But All Schools In Denver

WHAT brought about Denver's total school relighting program, probably the most complete in the nation? Odd as it is to apply the word competition to schools, perhaps it was competition and contrast that set this Rocky Mountain community on a program that has relighted, redecorated and modernized each of its 76 schools. That competition came from Denver's parochial schools, 80% of which had been relighted first.

It all started in 1940 when a young priest, principal at a parochial school had an ambition to do something to improve his school; staged a bazaar to raise funds for it. He and F. Bischofberger, lighting engineer for Public Service Co. of Colorado, were friends and "Bish" told him the best thing he could do for the school was to relight it so that the children's eyes could be protected. Funds raised from that bazaar lighted one classroom. It was such an improvement that soon all the Catholic schools were working on a relighting program, advised by Bischofberger.

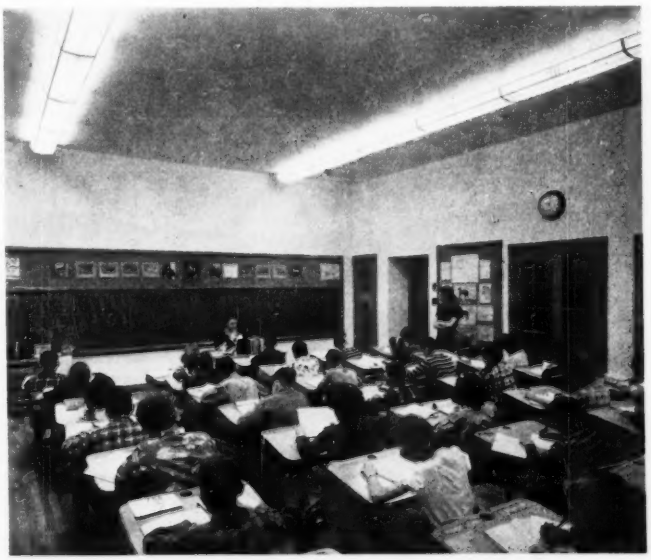
Naturally this aroused public interest and brought demand from parents of students at public schools that something be done for their children's eyes also.

In 1947 the school board and Dr. K. E. Oberholtzer, school superintendent, engaged Graham R. Miller, an engineer and former Public Service lighting man, as assistant superintendent in charge of business management for Denver's public schools. Bischofberger invited Miller and the staff of the public school system to see a just-completed parochial school : h Cathedral High School, which included relighting, light chalk boards, desk tops and floor, paint refinished, tilted desks, etc.—all the factors to create an excellent seeing and working environment. This created a strong impression. A public school program was decided upon.

Miller set about the program with engineering thoroughness. First he sent a questionnaire to each school principal asking for a detailed account of the physical needs of the buildings. Better lighting was top or near the top of every list of wants. Then followed tests of actual lighting and seeing conditions. Many old schools had no lighting outlets at all, many only one lamp on a drop cord, a few had four luminous-bowl fixtures per room. Survey results determined the size of the job, so big that budget appropriations and a bond issue were necessary to finance the project. Denver's program included modernization of usable old schools, building of several new ones, replacing of some that should be condemned. But regardless of whether the school was to be condemned and torn down later, no matter if it was in a poor or a mixed racial district, to Denver's credit the school board was determined to improve the lighting in *every* classroom in the district. This meant, 1,791 classrooms in 59 grade, 11 junior high and 6 high schools. The new school program called for 9 new elementary, 3 new junior high and 2 new senior high schools.

Now, school lighting is a controversial subject. Some favor one method, some another and the whole program could well have bogged down in argument and experimentation, but Miller determined on a plan that would be fair to all and yet guarantee lighting performance.

A letter invited all fixture manufacturers to provide fixtures for a sample room installation, for which the schools would pay. Fixtures, it was specified, must be those for which illumination data were available, must be easy to install and to maintain. Twelve companies accepted the invitation and their fixtures were installed



A completely refinished room: beside new lighting, light chalk boards, paint and trim, new light-surfaced posture desks, even floor sanded to lighten it

Typical of conditions before relighting is this typing room. It had four 200-watt luminous-bowl fixtures, was gloomy.

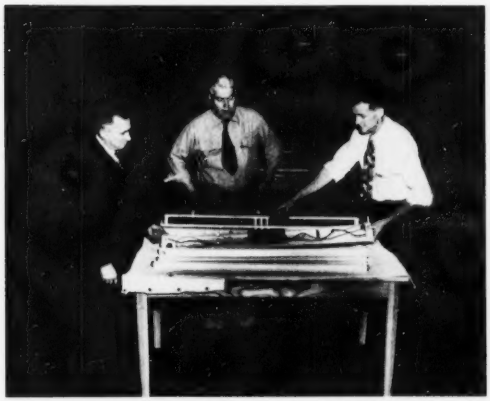
Now the same room is lighted by three continuous rows of two-lamp fluorescent units giving fine seeing conditions

A typical old and dark schoolroom, before the program started and by contrast, one of the remodeled classrooms. Even schools to be rebuilt were lighted

at Washington Park school. School board members and school principals were invited to make a selection. Then it was agreed to light the worst room in each of 58 elementary schools. Twelve fixtures per room on 12 outlets was the first idea. There was talk of installing only six of the twelve fixtures per room. Bids for 1,000 fixtures were taken and Sechrist Mfg. Co., Denver, furnished them. After six rooms were installed on this 12-outlet, 6-fixture basis, the situation was reappraised and it was decided to take three rooms at Bryant-Webster school and do a complete job, with 12 or 15 fixtures, depending on room size, in continuous rows and wired from but two outlets. The wiring economy of this decision was a factor in deciding the schools in which to go ahead and do the full job.

For the first 5,000 fixtures, purchase samples of fixtures were bought from the four lowest bidders. Three were able to make deliveries at that time. So an installation of each of these three was made in three separate classrooms. Records were kept as to the time of installation, relamping and for thorough cleaning, for the original cost of the fixtures was not considered the real cost. Day-Brite Lighting Inc., St. Louis, was successful bidder.

Fixtures ordered were two 40-watt fluorescent lamp units. Certain classrooms required more light and some 800, two 85-watt lamp units were bought. The 5,000 fixtures were to be installed the first year, 1947, but soon another 5,000 were ordered; another



School custodians were given special training in cleaning and assembling of units by William Watters, at table, right

Portable scaffold is used by custodians to give them easy access to fluorescent fixtures for cleaning and relamping

10,000 in 1948 and by this fall as the program nears completion some 22,500 of the 40-watt lamp fixtures and 800 of the 85-watt fixtures will have been installed.

Public Service Co. put two draftsmen on steady to make drawings. The school system furnished blueprints and a careful procedure was used to secure electrical contractors. It was a five-year program. Everyone entered it as a public benefit program primarily in which cooperation was the moving spirit. John Loiseau, president, and Gaylord Buck, vice-president, of Public Service Co., looked upon it as such in stimulating it and authorizing the support which Harold Rankin, lighting department manager, put into it. The Rocky Mountain Chapter, National Electrical Contractors Assn., worked closely with the schools in developing the sample and best installations.

The school board assigned an able electrician, William Watters, to be its representative as supervisor of electrical maintenance and to place the plans for wiring and lighting for each school to bids and to handle the relations with the contractors. Fixtures were purchased through the contractors.

Since maintenance of fluorescent fixtures is an important consideration in sustaining performance, Watters also started a program to train the custodians (janitors) of each school on assembling and disassembling, relamping and thorough cleaning of fixtures. Each school has extra enclosures enough for one full classroom, so that, as soiled enclosures are taken down, clean ones are substituted. Portable scaffolds to bridge over desks are furnished each school.

Contractors too developed methods and rigs to expedite the installation, such as adjustable scaffolding from which to work over the desks. Also worked out with them was a way to install the fixtures in the old schools that are soon to be demolished, so that the fixtures and conduit supporting them will be salvageable.

Each room was measured, analyzed and layout determined on a basis of getting the maximum lighting with minimum cost. Since the schools were built at many different periods, few were standard as to size of room or height of ceiling or other conditions. Hence plans were carefully drawn for each room. Some rooms have two, some three continuous rows of fluorescent fixtures; some mounted on the ceiling, some on stems. Some high ceilinged rooms have three broken rows of units. Originally 25 foot-candles average was the goal; now 35 f-c is standard. Only classrooms are relighted in the original program. When that is done the halls, offices, gyms and auditoriums will be improved. Meanwhile too the classrooms are being repainted in lighter, more pleasing colors, desks are being sanded and resurfaced, so are the dark old floors. New chalk boards go in the new buildings and many in old buildings will be replaced also.

Results have been so widespread in benefit that the program is considered by all a success and a matter of pride to the community. Reflections from it have initiated similar programs in Cheyenne, Sterling, Brighton, Colorado Springs and in fact throughout the area. Operating difficulties, because of so careful a selection and maintenance program, have been very few. The Denver schools give an average of $9 per fixture installation cost; 17 cents a day per classroom cost of operation.

A contractor's scaffold rig with several working levels speeded installation

Denver schools' electrical foreman Watters, F. Bischofberger, test shop lighting

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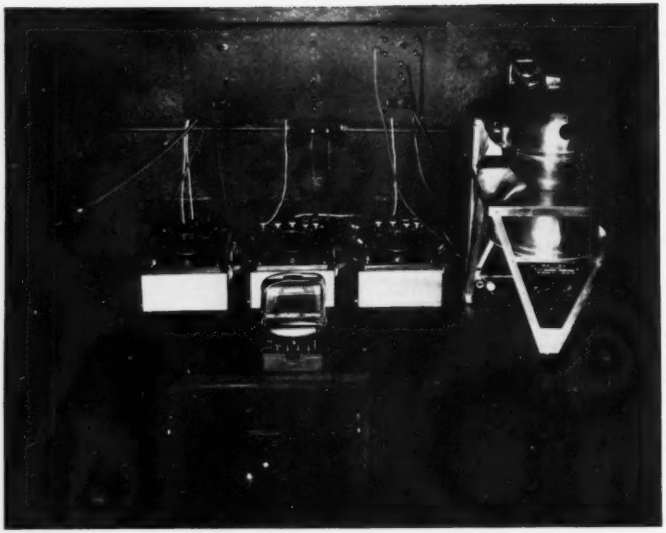


Why Have Illumination Design Data ?

James H. McCulloch*
Development Engineer
Sunbeam Lighting Co., Los Angeles

Instruments used in testing: line voltage by Superior regulator beneath bench; volts, amperes and watts by Weston laboratory standards; the Illumitronic reflect-transmissometer at right measures the reflection of and transmission of paint, glass or plastic; a 50 microampere G-E meter measures light cells

As long as men want to see after the hours of natural daylight, or as long as men want to improve seeing conditions during the hours of natural daylight, there will be a need for the manufacture of lighting fixtures. And as long as men in the lighting business are interested in the questions, "How much light is enough?" and, "What kind of lighting is best?" there will be a real need for illumination design data.

Since the customer is the one who will be using the light, his needs ought certainly to be given consideration. The customer needs light and wants light, but there is an economic limit to the quantity of light desirable for any given job. Levels of light higher than necessary are just as useless as are six-lane bridges in narrow country lanes — luxurious, perhaps, but usually connoting super salesmanship, or poor planning, or plain graft.

The installation of the wrong type of lighting equipment, too, is usually indicative of poor planning, or super salesmanship. But proper planning of the quantity of light and of the quality of light is dependent upon knowledge of two facts: first, how much light of what kind is needed for the particular job at hand, and second, how can it be obtained.

The development of proper standards for the lighting of various tasks has already been undertaken by many groups. The Illuminating Engineering Society has published many of these standards. It is relatively easy today to find authoritative recommendations for quality and quantity of light. But in trying to discover how to get that quality and quantity of light, a real problem arises.

There are literally thousands of types of lighting fixtures on the market. One large Western manufacturer lists more than 250 varieties in the fluorescent field alone. But which of these thousands of fixtures will be the best one for the particular job at hand? There is no reason for the customer to be satisfied with any but the best for his job. How can the best one be chosen?

Facts are needed; facts about each of the fixtures on the market. How bright is it at various angles? How much light does it give upward, how much downward? Is it efficient? Is it well painted? Is a plastic side panel as well suited to the fixture as glass would be? Can the sockets be removed from continuous rows of fixtures?

No customer has the time nor the ability to try out each fixture for himself. He must depend on some type of written information to allow himself to survey the field in a quick search for the fixture he wants. That written information comes most reasonably from the manufacturer himself, although certain parts of it should be based on reports from independent testing laboratories. No one except the manufacturer, however, will assume the responsibility of publishing such material. Without such data available, illumination design becomes mere guess work or high-pressure salesmanship. The data must be disseminated to be of any real use.

The publication of factual data and reports concerning lighting fixtures can, then, be of definite value to a customer in choosing the fixture that he needs. In many cases it will be found that the customer will not have the technical background with which to use the data, even if the data are available to him. It is in situations like this that the published facts become a valuable sales tool in the hands of a man who knows how to use the data. The customer tends to have faith in the salesman who is equipped with facts as well as with beautiful brochures in glowing terms. And if the salesman represents several manufacturers, his sale will be more easily made when he presents to the customer the line of fixtures about which he can quote facts, rather than the line about which he knows nothing but the price.

There are now enough manufacturers publishing illumination design data for their products to give the public a taste of what can be done if the manufacturer is willing to do it. Products by these manufacturers are being specified for many jobs for the simple reason that architects and engineers are prone to use equipment which has been tested. These architects and engineers specify such equipment because they know what to expect from its use. The only way they

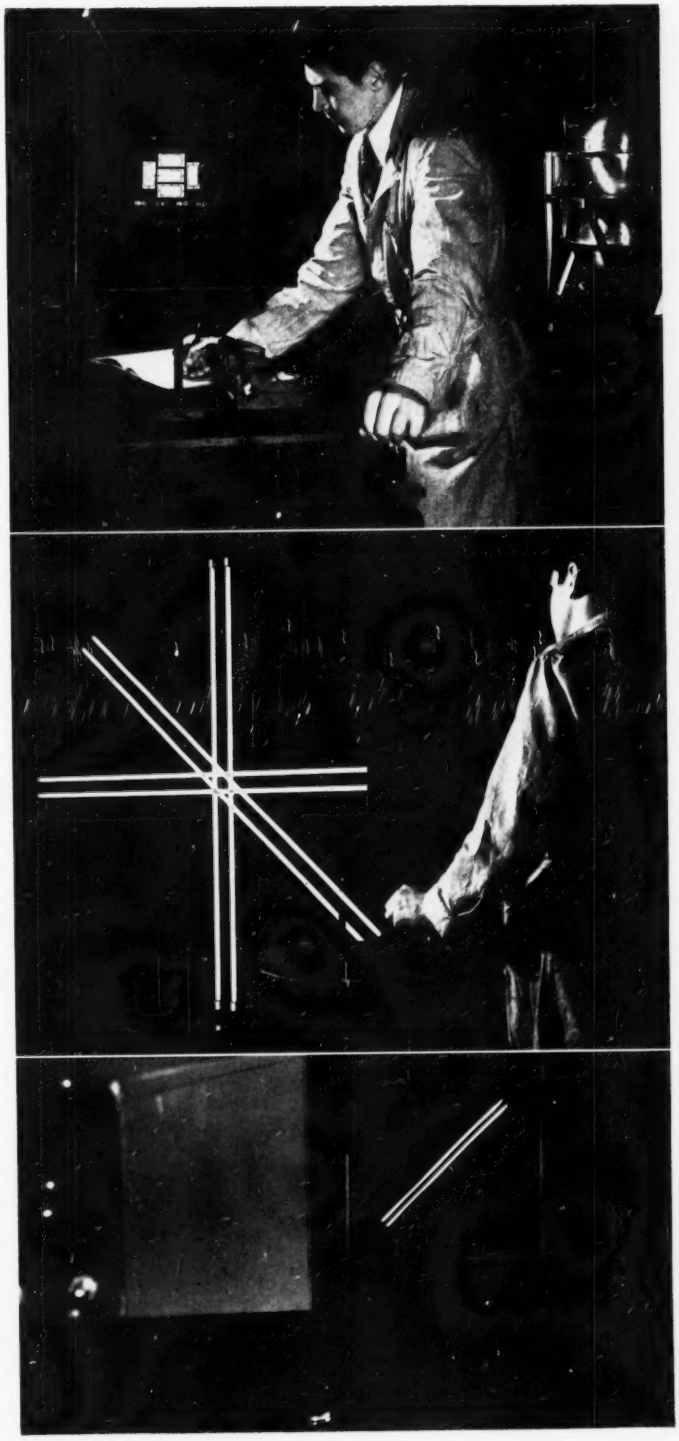
* Presented at Northwest Lighting Conference of Illuminating Engineering Society, Portland, early this year.

know what to expect from its use is that they have in their files records of the tests, and quickly available illumination design data on which to base their computations. These results got into those files in only one way: the manufacturer published them. Such manufacturers are selling to many customers on that basis alone: that illumination design data are available to the person who is doing the layout.

In many other cases, the same manufacturers are selling to customers who can't even tell a room index from a lumen output, for the simple reason that their publication of test results has lent to their products a prestige which they would not otherwise enjoy. The prospective customer knows that the product has been tested and that the manufacturer is willing to make public the results of the test. Without even understanding the test or its results, the customer often simply assumes that this product must be good, or else the manufacturer would not dare to publish the test results. This prestige factor alone is valuable in dollars and cents to the manufacturer and to his sales organization.

There are three categories into which the data useful in the calculation of illumination design fall. First, the recommended standards as published by a presumably unbiased authority such as the Illuminating Engineering Society. Second, the data useful generally regardless of the type of fixture or type of job. These generally useful data include lumen ratings for lamps, room indices, general layout recommendations concerning spacings, and general recommendations concerning fluorescent versus incandescence, indirect versus direct, general versus specific illumination. Third, specific information concerning specific fixtures, including brightness data, distribution data, and coefficients of utilization.

The first two of these categories are already widely published. Tables of recommended levels are so easily available that the problem becomes one of selecting which table to use. That problem is made interesting by the fact that not all of the tables coincide in all respects. The data in the IES Handbook might well be adopted



Fluorescent or Slimline fixtures or lamps are mounted for testing on a turret head which can be rotated by a crank. Center picture shows lamps photographed in three planes, in each of which they can be rotated 180°. Light is reflected by a plate glass mirror (lower picture) to strike five paralleled light cells shielded by a truncated cone, shown in upper picture

as a standard inasmuch as it may be presumed to be unbiased.

Trying to estimate how many fixtures are needed to light an office would become a real problem if the lumen output of various lamps were not commonly known. Actual experience from many years might allow a careful person to make an educated guess as to the number of fixtures to be desired. Lack of experience would bring the problem down to an uneducated guess, or to the simple level of guessing how much the prospective customer might be able to afford.

But we have easily available information as to the amount of light produced by each of the common and many of the uncommon light sources. This information is a basic necessity.

Amount of Light

The number of lumens introduced into a room by a given number of lamps, however, is useless unless we know how many of those lumens reach the work surface. A moment's consideration will tell us that much of the light from the lamp is going to strike various wall and ceiling surfaces instead of striking the work surface. Some of this light may be reflected to the work plane, but much will be absorbed or reflected to other wall and ceiling surfaces.

To get help on this problem we can refer to some basic research done years ago by Harrison and Anderson. By making exhaustive tests, they came to some practical figures showing that rooms of certain proportions used the light within those rooms in certain ways. This information has been boiled down until today we can refer to simple tables of room indices to find a room index for the particular dimensions under consideration. For those so minded, there are simple formulas for computing room indices. Either the tables or the formulas become a basic necessity in computing illumination. Both are widely published.

To find the amount of light reflected from ceiling and walls, we have to know something about the reflection factor of the surfaces. This is a figure which can be approximated, with experience, guessed without experience, or measured by a reflectometer. A handy type of reflectometer for this purpose is a small card on which are printed various shades of grey. Holes punched through the card at several points allow the color of the wall or ceiling to show through the card. By squinting the eyes, a fair approximation of matching can be made, and one of the holes will be found through which the wall or ceiling paint seems approximately as bright as the particular shade of grey surrounding that hole. On the card are printed the various reflection factors of the various shades of grey. The reflection factor corresponding to the particular shade of grey which seems most closely to match the wall or ceiling is then assumed, with a fair degree of accuracy, to be the reflection factor of the wall or ceiling. These cards are at present not in wide circulation, but one of the nationally known manufacturers is now distributing them.

A more accurate reflectometer than the one mentioned earlier consists of a sphere coated inside with highly reflective white paint. A beam of light is directed to strike the inner white surface, and the voltage applied to the lamp producing this beam is varied until the meter reads one hundred. The same beam of light is then made to fall on the sample being tested, so that the light is reflected by the sample. The meter will now read some lower amount, which is the true reflection factor of the sample.

But having collected all this material—the lumen rating of the lamps, the room index, the reflection factor, the recommended level of illumination—we are short one vital factor.

Test Reports Vital

It is the third category which lacks publication, and with which this paper is primarily concerned. This third category consists of reports of tests, and of material computed from test report data. What does the fixture itself do to the lumen output of the bare lamp? Is the fixture well painted? Is its glassware so muddy that it absorbs all the light which should strike the working surface? Does it put more light in the eyes than it does on the task? Even in the crudest bare lamp fixture, the reflection factor of the paint is going to make a definite difference in the usefulness of the lamp.

We obviously need some kind of a report on the fixture itself if we are to be able to use any of the data so far enumerated. This report can come from the manufacturer himself, but if it does, it is open to suspicion as perhaps being overly optimistic. Preliminary reports from a manufacturer who has proper equipment for testing can be of definite value, but for long-range work a report from an independent testing laboratory is necessary.

This report should give information as to candlepower distribution, efficiency, brightness, and perhaps paint reflection factor.

The consumer, or his agent, the illumination engineer, needs these data for making use of the fixtures; it can be had only by test, and the manufacturer is certainly the one who should have his product tested, because the prospective customer doesn't want to go to the expense of having tests made on all fixtures under consideration for a job. A manufacturer must have considerable self confidence to put his fixture to such a test, for unless his fixture measures up to its competitors, the fixture has to be redesigned, and the test was a waste of time and money.

It may be of interest to note that the candlepower curve for incandescent fixtures is taken by a mechanism which rotates the fixture during the test, so that the reading is actually the average of the candlepower at any given angle above the nadir. Since in fluorescent fixtures it becomes unhandy to rotate the fixture fast enough to get an average reading, three separate readings are taken. One reading is taken from beneath the fixture to a point above the fixture, moving in a plane perpendicular to the axis of the lamps. A second curve is taken by moving from beneath the fixture to a point above the fixture, moving in a plane parallel to the axis of the lamps. The third curve is from beneath the fixture to a point above the fixture by a path in a plane at 45° from the axis of the lamps. The three readings are then averaged, double weight being given to the 45° curve, in order to compute the lumen output of fixture.

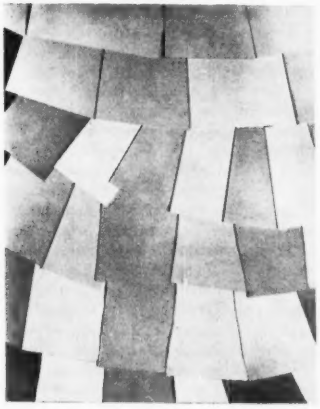
This test can be made by taking readings at points along a semicircle centered on the fixture, or by taking readings at one point, and turning the fixture itself. The second method naturally takes less room. The fixture is mounted on a turntable and rotated, readings being taken at certain angles. The fixture is then mounted at 45° to its first position and rotated again. The third curve is taken by mounting the fixture perpendicularly to its first position and rotating it the third time.

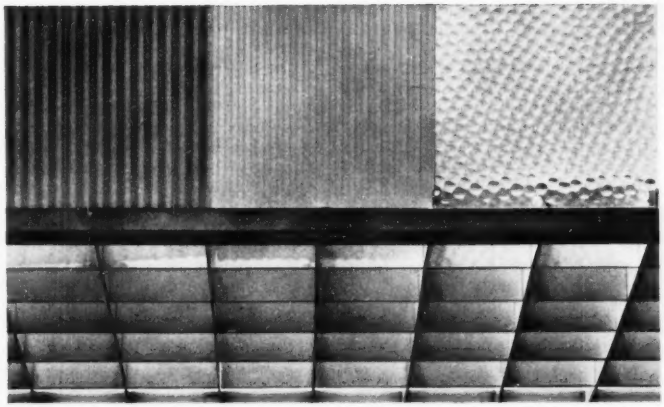
Bare Lamp Tested

The bare lamp is then mounted and tested in the same way. The bare lamp is arbitrarily assumed to have rated output, and the bare lamp readings are then used to find a factor by which to multiply all test readings in order to have candlepower and efficiency in terms of standard rated lumen output rather than in terms of the specific lamps used in the test.

These data are tabulated in a convenient form and from them are computed lumen outputs, zone by zone, and candlepower rating at certain angles.

Brightnesses are read by means of a brightness meter which gives readings in footlamberts or in candles per square inch. All of these data may then be entered on a report form.





Need for testing reflectances and the transmission of glass, louvers, etc., illustrated here. At left samples of many paints manufacturers claimed were white "and a dollar cheaper than what you are using" but reflectance measures from 51 to 84%. At right three samples of glass at the side of a louver to test the side brightness, transmission

The usefulness of these data naturally depends on the care with which the work is done, i.e., the human factor; and upon the quality of control and test mechanism, i.e., the meter and machine factor. For example, the voltage must be controlled during the entire test, because fluctuations in line voltage during the test would give erroneous results. The voltage supplied by the regulator must be accurately known, as well as the line current and the power, in order to compute the power factor. The meter indicating the intensity must be a highly sensitive instrument responding to currents of only a few millionths of an ampere.

The test report usually has some standard form. On this report may be found the candlepower distribution, the lumen output within certain zones, the efficiency of the fixture in terms of light output compared to bare lamp output, the brightness at various angles which have been more or less standardized, and a generalized description of the fixture being tested.

The brightness data are directly applicable so far as checking against arbitrary standards is concerned. Before being able to check brightness ratios, computation must be made concerning the brightness of the ceiling where this fixture is used.

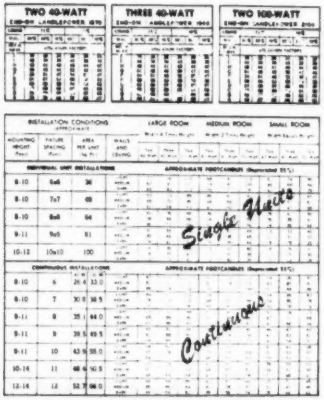
The lumen output by zones is useful only in arriving at generalized classifications such as indirect, direct, focusing, and the like. The efficiency of a fixture is applicable in measuring how well the fixture is designed, but cannot be directly used in a lighting lay-

COEFFICIENTS								
Ceiling		75%			50%		30%	
Walls	50 %	30 %	10 %	50 %	30 %	10 %	30 %	10 %
Room Index J	45	42	40	44	41	39	41	39
I	54	51	50	52	50	49	50	47
H	58	56	55	56	55	54	55	53
G	62	60	59	60	59	57	58	57
F	65	63	61	63	61	59	61	59
E	69	67	65	67	65	64	64	63
D	73	70	68	70	69	67	68	67
C	74	72	69	72	70	69	69	68
B	75	73	72	73	71	70	70	69
A	76	74	73	74	73	71	72	70

3

Examples of illumination data published by reputable manufacturers for guidance of designing engineers. (1) Day-Brite Lighting; (2) Benjamin Electric Mfg. Co.; (3) Curtis Lighting Inc.; (4) Holophane Co. Others do likewise

1



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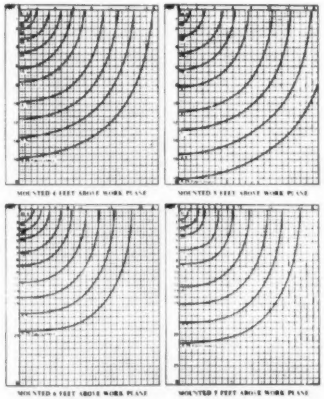

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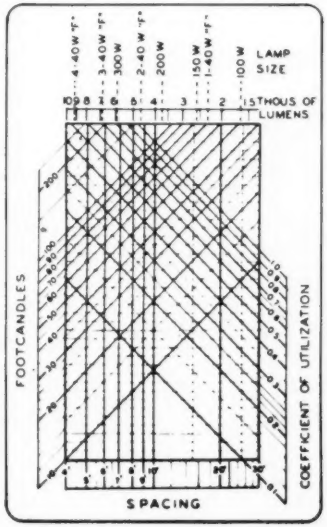


out. The candlepower data may be used directly in point by point computations of lighting layouts.

To compute coefficients of utilizations, another form is used, on which are printed the constants applicable for various room conditions. As a matter of passing interest, this computation of the common coefficients of utilization entails 240 multiplications, 80 additions, and 80 divisions. A calculator is a necessity if any speed is to be made. Having arrived at the coefficients of utilization, any of several forms may be used for their publication.

The most common is probably a rectangular block, tabulating reflectances across the top, and room indices down the first column.

Another common method is a highly shortened form approximating room conditions and dimensions. Another method of showing these results is in graphical form, wherein the final result can be found by means of a pencil and a straight edge.

Another graphical form is somewhat more intricate, necessitating a little more study and a lot more practice.

The cost of the actual publication of the illumination design data is small compared to the cost of the assembling of the data. For this reason it is more economical to assemble these data only once for each fixture, and to publish it from a central source. Until such time as some independent central testing house is set up and sold to the manufacturers as the proper agency for the handling of testing and the publication of test results, the best method of centralizing such work, at least for each manufacturer, is for him to publish the material himself, rather than letting his various sales agencies or his various customers work out the problems for themselves. This latter possibility is obviously the more expensive because of the duplication of effort.

The publishing of recommendations concerning the use of specific lighting fixtures for specific jobs would be advantageous to the engineer and architect, inasmuch as it would save him time in looking for the fixture he wants with which to do a certain job. This is, actually, illumination design data, and should be made available by publication.

Illumination design data should allow the prospective user of lighting fixtures to make a reasonable choice of the proper kind of fixtures as well as of the proper number of fixtures. The data published today by a few leading manufacturers are very useful in computing the number of fixtures—but the choice of the kind of fixture is largely dependent on appearance. If the appearance of several fixtures is relatively the same, the choice among them is likely to be made by consideration of cost. Efficiency, or efficiency as indicated by the coefficient of utilization, is often considered. But there is almost no information available concerning the basic utility of a fixture as applied to a certain job.

For example, the high side-brightness of the well known URC type fixture has been used against it in the cases of large offices with relatively low ceilings. The fact that such side brightness is of no moment in a small high ceiled office is often neglected. Test results show the brightness, and leave it up to the designer to know how to use it. This is eminently desirable from the point of view of the illumination engineer, for it causes the public to turn to him for help in such interpretations. But the customer who feels that he cannot afford to hire a specialist for lighting his tiny store is left out in the cold, while his account would not be of any moment to a professional engineer.

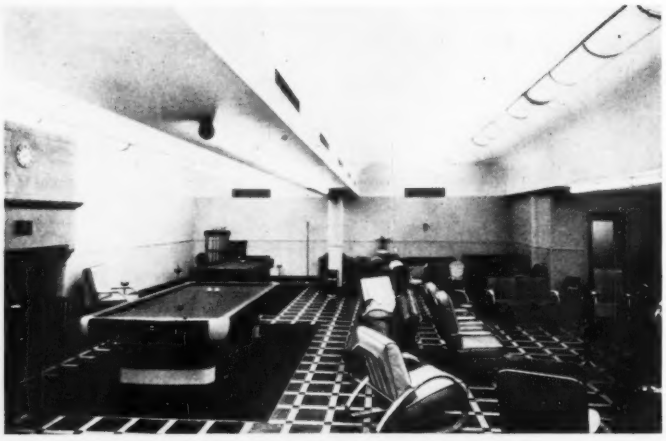
There is a need for information on the usefulness of various types of fixtures for specific applications. The manufacturer could profitably make such recommendations without damaging the business of the professional illumination engineer. The engineer's business, on the contrary, would tend to profit because the consuming public would, for the first time, have called to its attention the fact that the proper choice of fixture is not a matter of appearance alone, that there are facts to be known about lighting fixtures which will make their use more satisfactory, and that it might be wise to call in a specialist if at all possible.

If the manufacturer doesn't publish test results, we can assume only that he:

1. Doesn't understand the consumers' problems.
2. Doesn't think his fixture is worth testing.
3. Has had his fixture tested, but the results were so bad that he dare not publish them.
4. Knows so little about illumination that he doesn't realize the need for such publication.

The altruistic manufacturer realizes that the customer needs and deserves specific information concerning design data. The altruistic manufacturer knows that publication of design data is a real service to the lighting engineer. The hard-headed business-like manufacturer knows that publication of data produces valuable prestige for his products, prestige which means dollars and cents.

Hence the publication of illumination design data is important to the manufacturer of lighting fixtures.



Recreation Hall Lighting

General illumination for a recreation hall in San Francisco is provided by semi-indirect fixtures using Wakefield Star units, each with four Slimline fluorescent lamps in three rows spaced 17 ft. Supplementary lighting consists of semi-indirect glass-enclosed fixtures with Wiremold fluted Alba-lite glass, each with one type F fluorescent lamp. These are mounted in two rows on bottom of beams between rows of Slimline. Incandescent lamps in Holophane Counter-lite units light pool and billiard tables.

The Case for The Flexible Ceiling

Victor Gruen
Gruen and Krummeck
Hollywood

Spectacular modern store designs by this architect and store designer are to be found throughout the West. This talk was presented to a recent Illuminating Engineering Society conference in San Francisco, making use of part of a presentation for flexible ceilings to Macy's new Kansas City store, where there will be full use of idea

DESIGNING with artificial light embraces much more than hanging a lighting fixture in the center of the room from the ceiling. To design architecturally with light means to take fullest advantage of the tremendous possibilities which the technological development of artificial lighting has presented to us. Only by doing so can we achieve the fullest practical use and the utmost psychological effect from lighting sources with which to shape architectural forms.

Building exteriors are no longer solely dependent on the light of the sun. New, undreamed-of architectural forms can be revealed by spilling artificial light over walls and columns or by sculpturing the building by accentuating certain parts of the structure with spot lights.

And in interiors, artificial lighting is no longer a poor substitute for "the real thing" but a power in its own right, completely independent from the light of the sun.

The arrival of the windowless building shows clearly and most concisely that artificial light has advanced from playing a supporting role to being, in a double sense, the real star of the show.

And we, as the producers of the show, are learning to cast it in a manner which can create sensations of many kinds—from awe-filled admiration to homey coziness, from cool efficiency to sweet romance.

Lighting can change the apparent physical character of a room; it can make it appear higher or lower, wider or narrower. By means of lighting, we can direct the interests, and even movements, of the on-looker, can bring certain objects into the "limelight" and make others appear unimportant. The correct handling of light, which can be master or tool in architectural design, is, in my opinion, one of the foremost tasks of the architect. Here is an example of how we apply this philosophy to practical problems—the designing of store buildings and store interiors.

We believe that an efficient department store should fulfill two main criterions:

1. Flexibility. (The ability to change size and shape.)
2. Individuality in the character of departments.

These two qualities are interconnected. Without flexibility a department store could not achieve individuality of departments save by using means which I call "frozen architecture."

Frozen Architecture

With this term I characterize all architectural elements which, by their cost of erection and cost and difficulty of removal, tend to become immobile or "frozen" and which therefore, for reasons of economy, will remain unchanged even after they have become outmoded.

In this category are the plastered ceiling, fancy plaster work, elaborate case work, cases set in plaster recesses, plaster curtain walls, canopies, etc.

Frozen architecture also freezes the lighting system. A fixed lighting system is forced upon the store by the fact that the plaster ceiling exacts too great a toll in expenditure for any changes which at a later date may prove necessary. Therefore, the plaster ceiling is not suitable for a flexible store layout.

Ingredients of Individuality

Individuality or character or atmosphere of departments can be achieved by:

1. Shape
2. Light
3. Color

If a department has *shape*, that means if it creates a feeling of a room, it will by that fact give the shopper a feeling of restfulness, "feeling at home," of no interference from outside influences.

Lighting can lend the feeling of warmth or coolness to a room; it can be arranged in such a manner as to call attention to displays of certain merchandise; it can be varied in intensity and in quality.

Color can express clearly the character of the merchandise department by its psychological effects on the shopper.

Why Flexibility?

A department store is a living organism. It has to follow the "march of time," new merchandising trends, developments in the mechanical, lighting and operational fields. We are living in rapidly moving times. Technical science is developing fast and with it change steadily the means of lighting, heating, air conditioning, store operation, etc. We need flexibility in order to (1) enlarge or (2) contract departments, (3) to change their appearance in a superficial manner, (4) to change their position and (5) to be in readiness to accept improvements offered to us by technical science.

Means for Flexibility

Flexibility requires:

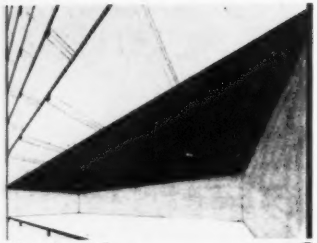
1. Flexible ceiling.
2. Flexible lighting system.
3. Removable modular wall panels.
   (a) breathing
   (b) solid
4. Convertible movable fixtures.
5. Flexible arrangement of mechanical features.

The flexible ceiling, together with a flexible wiring system, enables us to use the appropriate type of lighting fixture for each portion of the floor.

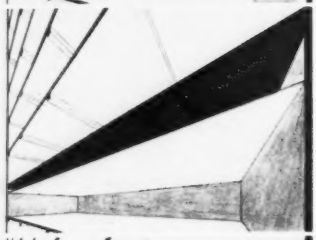
It allows to be added at any time wiring conduit, pipes, ducts for additional mechanical equipment or for completely new developments, and it permits the exchange of mechanical or electrical devices which may become outmoded by new ones.

On the next two pages illustrations integrate the problem of lighting with other problems encountered in department store design.

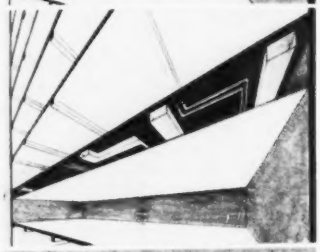
It is our conviction that the modern department store, as a living and growing organism, needs flexibility; but at the same time, it cannot neglect giving atmosphere and individuality to all of its departments.



1—The conventional floor and ceiling construction in a department store consists of the structural floor slab . . .

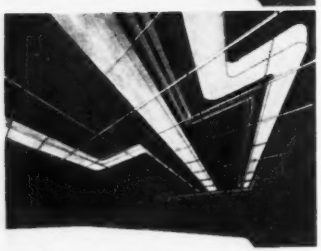


2—and a hung plaster ceiling, with an empty space between the two.

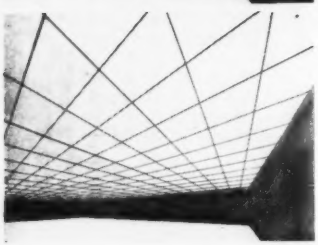


3—In this empty space run the arteries and veins of the mechanical heart of the store.

4—The plaster ceiling has a disadvantage of being made of homogenous, sensitive material which has to be applied in wet condition, needing time for drying.



5—The flexible ceiling replaces the homogenous plaster skin with a grid of metal channels to which



6—individual panels of practical size are fastened in such a manner that they can be removed and replaced by simple means.

7—Every panel becomes an access door to the space below the floor slab to reach ducts, pipes, electric wires, communication lines, pneumatic tubes, etc.

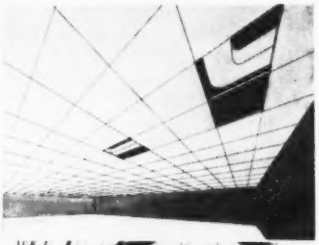
8—The flexible ceiling results in a flexible floor for the merchandising floor above because of accessibility to the same facilities.

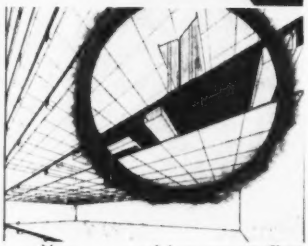
9—It opens the "third dimension" to display man and decorator. He can fasten to individual panels, draperies, curtains, display backgrounds, etc. Only one or more panel may be spoiled and is easily replaced.

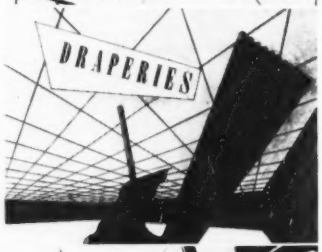
10—The flexible ceiling allows the installation of shape creating walls, curtain walls and partitions without the necessity of construction work.

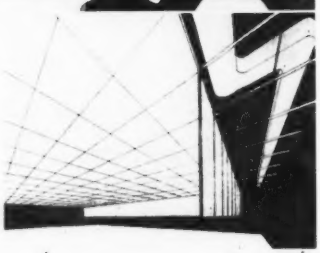
11—The flexible ceiling provides, because it is made of acoustic panels, sound absorbing qualities.

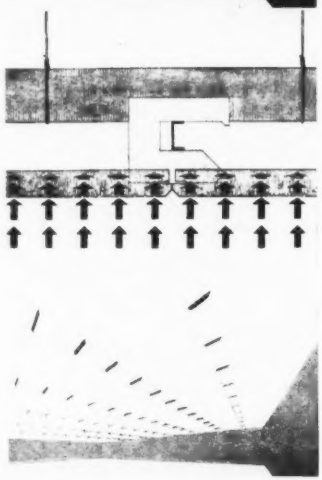
12—It is the basic requirement for flexible lighting. Conventionally, stores have employed overall, evenly spaced systems of fixtures of equal lighting quality, intensity and cost over the entire space.

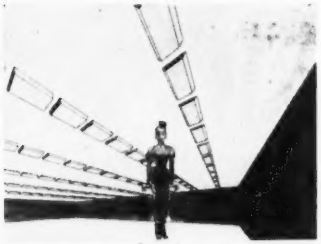




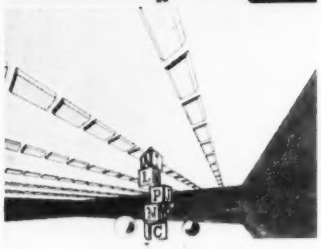






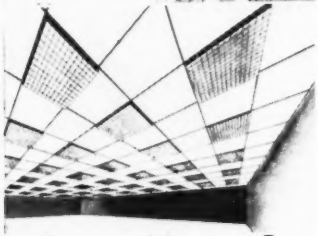


13—The disadvantage is that the same quality and quantity of light is used over areas regardless of their character and use. Thus, the lighting for the evening gown salon is in principle the same

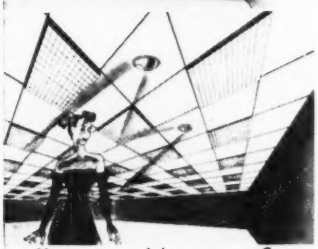


14—as the one over the children's toy department.

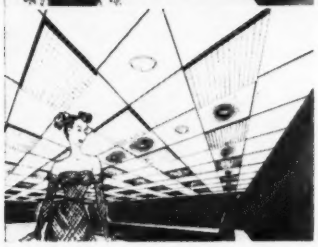
15—The lighting above a shoe forward stock room is the same as over the shoe salon.



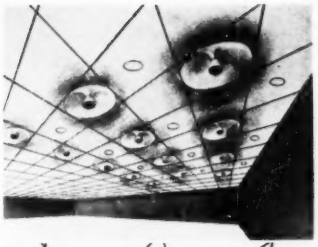
16—As samples for different lighting fixtures which could be utilized in a flexible ceiling: For departments which need an even shadowless light, a recessed louvered fixture with fluorescent lighting.



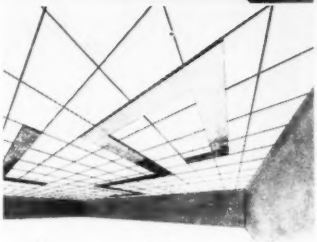
17—For accent lighting of displays, spotlights or swivel spots.



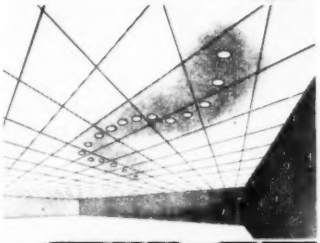
18—Above sales counters and show cases, built-in incandescent fixtures with flood light reflector lamps.



19—For atmosphere lighting or creation of architectural effects on the ceiling, recessed domes with silver-bowl lamps.

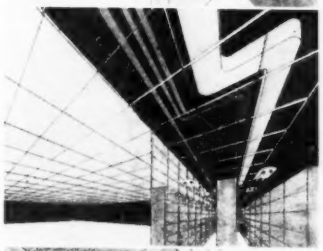


20—For directional lighting, narrow fluorescent strips forming patterns.

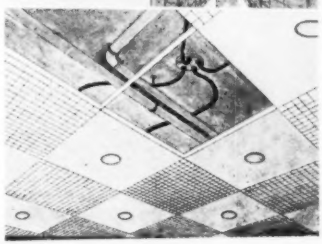


21—For rooms with curved walls, recessed incandescent lamps following the shape of the wall.

22—For marking rooms, stock rooms, etc., surface mounted industrial fixtures of the fluorescent or incandescent type.



23—For narrow stock room aisles, fluorescent fixtures mounted right above stock room shelving within the aisle space, etc.



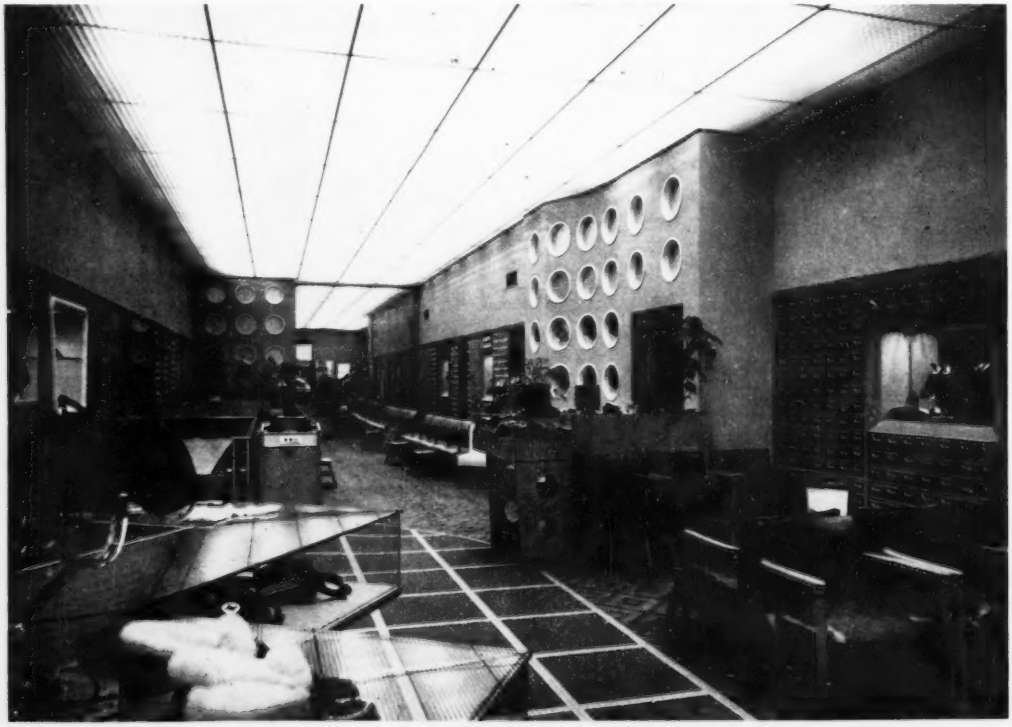
24—As far as flexible wiring is concerned, this is a wiring system which allows the moving of lighting fixtures as they may be located or relocated by means of multiple plugs mounted to the ceiling slab connected with the fixtures by approved wiring methods.

IDEAS IN LIGHTING

Trend is toward greater use of louverall ceilings and special effect lighting

Perimeter cove with double row of 40-watt fluorescent lamps lights the upper walls and ceiling to provide 25 f-c of soft general lighting at the Fruitvale Toggery, Oakland

Louverall ceiling in Spellman Shoe Store in Portland made a striking lighting installation. Seventy-one two-light Benjamin industrial units 18 in. above louvers and spaced 3 ft. x 5 ft. provide 85 foot-candles at the counter level



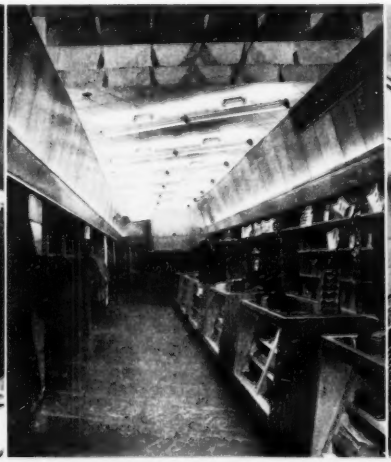
Schubach

Portland Federal Savings & Loan

Schubach jewelry store in Boise, one department of which is shown at upper left, is illustrative of a planned lighting installation. Sign tubing cove lighting illuminates ceiling off-set as well as interior of glass-top showcases. General ceiling lighting is provided by four-lamp Sechrist fluorescent fixtures. Supplemental spots give specular light on gems. At the Portland Federal Savings & Loan office (upper right), sixty-three 300-watt silver bowl lamps in semi-recessed spun aluminum reflectors in 13-ft. ceiling provide 40 f-c of pleasing totally indirect lighting. At lower left is shown an innovation in triplicate mirror lighting in the tailoring establishment of Weber & Pile, Hollywood. The whole center glass panel acts as a large low-brightness area source of light. By fixing the position of the full-length mirror on each side at slightly different angles, the customer is enabled virtually to "look around" himself. The idea was conceived by Paul O. Davis, architect, and Stanley C. Meston. Clinton Clothes Store in Vancouver, B. C., shown at lower center, is strikingly lighted. Acoustical ceiling tile and the Dawn two 40-watt lamp fluorescent fixtures were applied at an angle of 50° to the lengthwise axis of the store for effect. Along the sides of the store is a continuous line of single 40-watt channels. Ceiling louvers backed by 300-watt incandescent lamps in RLM reflectors give the forward end of the store an interesting variation. General intensity is 33 f-c. Ciro of Bond Street, exclusive jewelry store of San Francisco (lower right), is lighted with 300-watt lamps in stippled glass-covered downlights to provide 55 f-c of specular lighting on the jewel counters and 48 f-c in the showcases

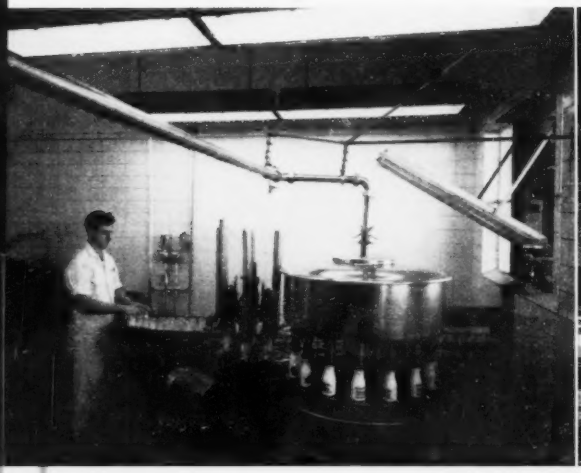
Weber & Pile

Clinton



Ciro

INDUSTRIAL

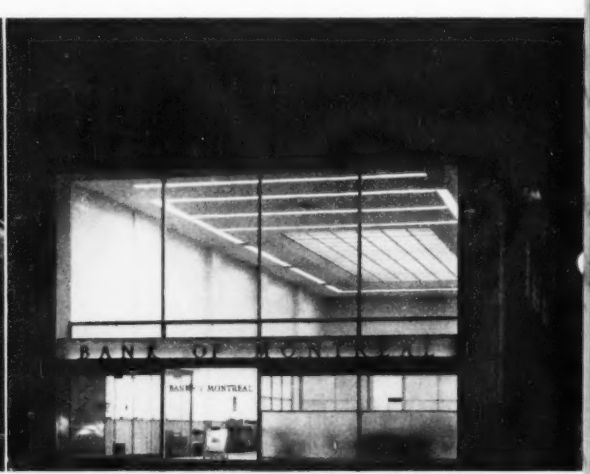


Glass enclosed, fluorescent four-lamp Benjamin industrial units made a prize winning installation at the Green Glen Dairy plant in San Francisco in this job layed out by A. C. Anderberg and Stanley E. Howatt, Pacific Gas and Electric

Combination units consisting of one 400-watt mercury lamp and one 1,000-watt incandescent lamp in Westinghouse Alzak hi-bay fixtures provided high-intensity lighting at the H. S. Crocker printing plant at San Bruno, Calif.

COMMERCIAL

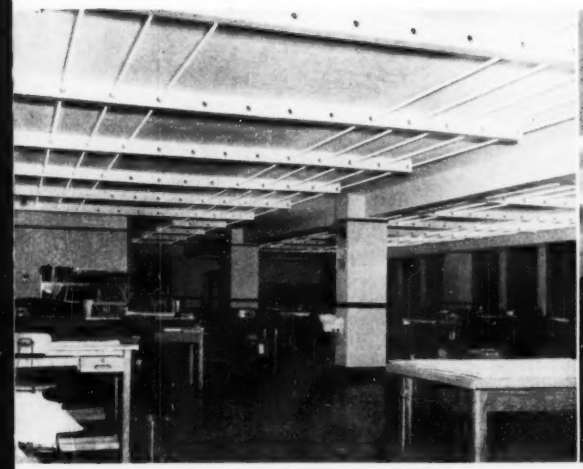
Whelan Drugs in Los Angeles has followed theater practice of providing for replaceable letter signs on luminous background in this new store front. Interior is lighted with 200-miliampere Slimline providing 70 foot-candles



Huge skylight in this Vancouver, B. C., bank is a false skylight, covered by a true skylight, and in between are fluorescent lamps that provide a daylight quality at night. Natural and artificial light combine in the daytime

Rectified fluorescent lighting with its blue light at Boeing's Seattle plant is being systematically changed over to regular fluorescent lighting due to inability to obtain the old tubes. Involved in this installation are 2,200 fixtures

Mercury-vapor lights in 1,000-watt units in the open hearth pit building at Bethlehem Pacific's South San Francisco plant has doubled the displaced incandescent lighting for better seeing and to provide greater safety



Cold cathode solved the lighting problem on this low ceiling drafting room of International Engineering Co., Denver. Morton Neon supplied 196, white 25 mm., 8-ft. cold cathode tubes installed by Stiles Electric Service

American President Lines, San Francisco, has a world route map outlined in neon on blue wall. Opposite wall, yellow, lighted by valance. General illumination from recessed troffers. Filament units add brightness to map wall

Street Lighting

Night view in Inglewood shows a typical modern street lighting installation on lines of the Southern California Edison Co. Incandescent luminaires furnishing 10,000 lumens are installed on 31-ft. Union Metal standards with upsweep arms to give mounting height of 30 ft. on state highway. Installation cost was kept low by installing a single inconspicuous wire on pole-top ridge pins to feed the series of lighting circuits

White Way

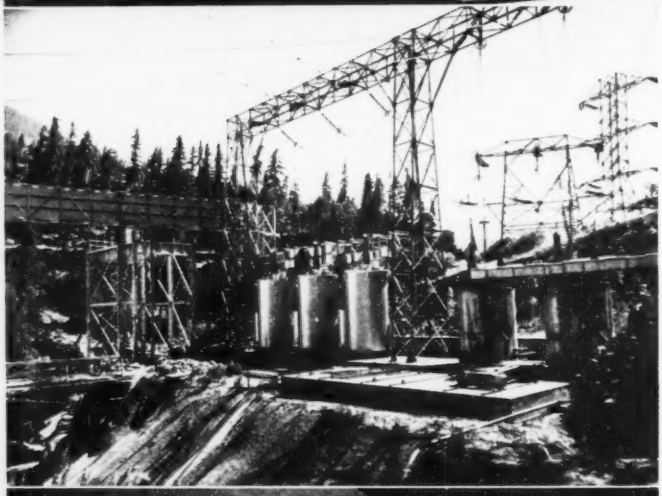
One of the best street lighting installations in the Intermountain region was recently completed in the Sugar House area of Salt Lake City. Approximately 1¾ foot-candles on the street is provided by 142 General Electric 15,000-lumen luminaires spaced about 100 ft. apart and installed on 6-ft. upsweep arms to give a mounting height of 30 ft. Utah Power & Light moved distribution lines to make system attractive

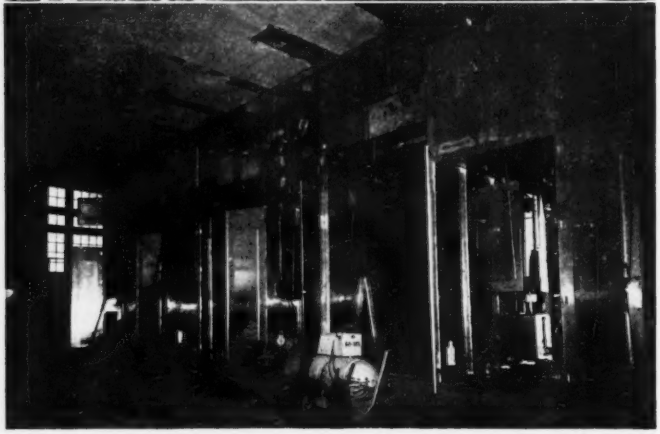
Traffic Safety

Traffic safety lighting is provided by two types of mercury-vapor lamps at a Beverly Hills, Calif., intersection. Three traffic islands required symmetric-type lighting which is provided by three Westinghouse AK-10 luminaires housing vertical burning 400-watt, 21,000-lumen mercury lamps. Type II light distribution needed for roadway areas is provided by three OV-20 luminaires in which similar lamps are also mounted horizontally

Flood Lighting

How large, vertical masses found in modern architectural design can be illuminated successfully is shown by floodlighting of the new Prudential Life Insurance building in Los Angeles. Engineer Ralph Phillips did the job with a combination of 82 narrow beam, wide beam, and medium elliptical beam S & M Lamp Co. floodlights. Design was complicated by light from ten miles of fluorescent tubing inside building





Edison Modernizes

THE time arrives in the life of electrical apparatus when lower power losses and increased maintenance justify modernization. Southern California Edison Co. decided that time had arrived at its two oldest Big Creek hydro plants when it launched a $3,300,000 modernization program. Work has been under way for more than a year and is scheduled for completion in April of 1950. Modernization will be complete from generator windings to delivery of power to the 220-kv. transmission lines.

Edison's Big Creek plants are located in the High Sierra, 70 miles northeast of Fresno, Calif. Plants 1 and 2 went into operation late in 1913. Plants 2A, 8, and 3 were built later and are not involved in the present program. At plants 1 and 2, switchgear and step-up transformers were located completely indoors following early practice. Generator voltage of 6,600 was stepped up to 150,000 volts for transmission to southern California. In 1923, transmission voltage was raised to 220 kv. by installing 150/220-kv. autotransformers.

In the present modernization program this double transformation is being eliminated by rewound transformers stepping from new generator voltages of 11 or 13.8 kv. to 220 kv. New outdoor switchyards with all new Kelman 3-cycle, 3.5 million kva., 220-kv. oil circuit breakers have been installed at both Big Creek 1 and 2. Old gen-

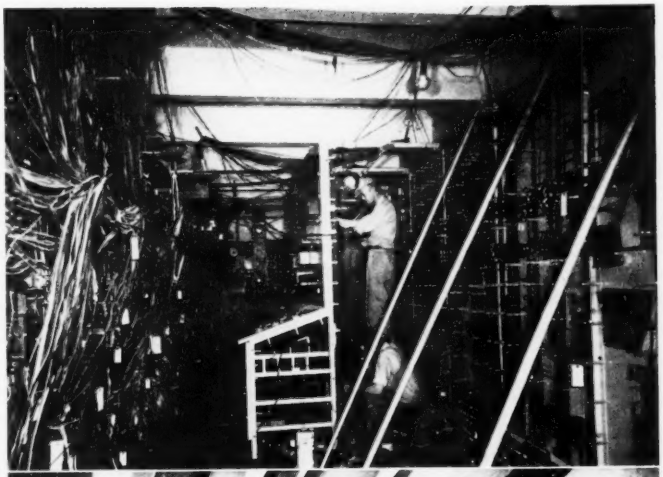
Electrical modernization at Big Creek. 220-kv. switchyard, above; isolated phase generator bus and rewound transformer bank, center; new generator switchgear and aluminum cubicles, lower left. At lower right is view of old 6.6/150-kv. indoor transformers

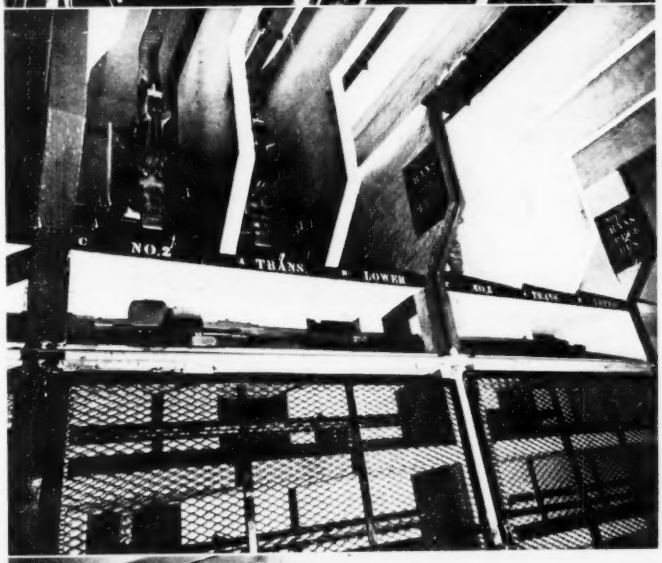
Big Creek Plants

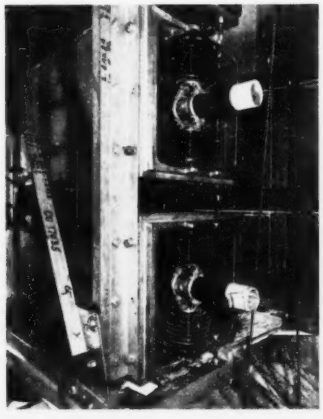
erator switchgear and concrete barrier bus cells are being replaced with new Kelman breakers housed in aluminum cubicles. Buses from generator breakers to outdoor step-up transformers are of the isolated phase type, aluminum enclosed. These buses and enclosures were also furnished by Kelman. Included also are complete new switchboards at both plants.

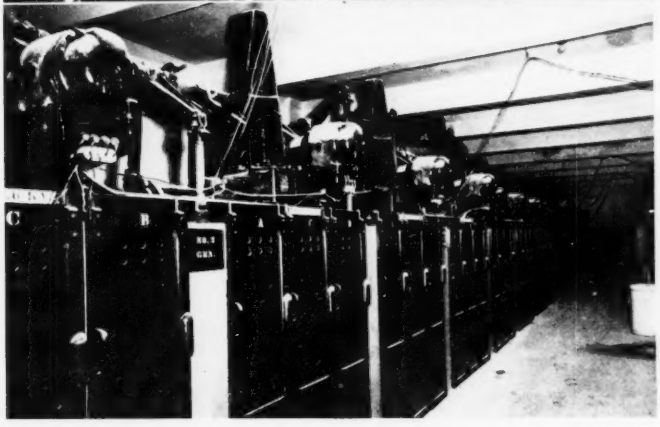
One of the most interesting phases of the job was the 220-kv. switchyard at Big Creek 2. It was impossible to provide a level spot, so the canyon wall was stripped of overburden and benches cut from solid granite for bus structures and oil circuit breakers. Energized 220-kv. lines had to be respected and much of the work had to be carried out under heavy snow conditions of the past winter. Keeping plants operating during the course of modernization called for planning and skill. The magnitude of this problem is emphasized by the photograph on this page showing a switchboard cut-over job.

Electrical work on the entire modernization project was contracted to the Bechtel Corp. Power Division. K. O. Taylor of that company is general superintendent for the project. C. W. White, chief electrical design engineer for Southern California Edison Co., was in charge of design. The entire program is under the direction of W. L. Chadwick, manager of the engineering department.

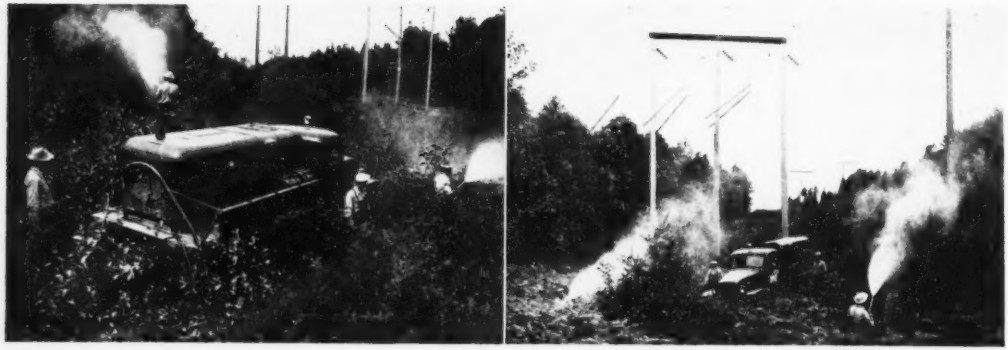








Installing new switchboard (above) was an exacting job requiring 180,000 ft. of temporary control wiring to keep equipment working. Views at center and lower right show old generator buses and switchgear. Lower left shows detail of one of new isolated phase buses



Chemical brush control on transmission line rights-of-way saves two thirds over former cutting and burning method

Chemical Brush Control

E. W. Conroy
Puget Sound Power & Light Co., Seattle

CONTROL of brush along transmission line right-of-way has always been a serious problem to utilities, particularly in the Pacific Northwest where growth is prolific. Cutting and burning the trees and brush is not a satisfactory control especially where there are telephone and telemetering circuits on the transmission pole lines. Moreover, it is an expensive operation. Puget Sound Power & Light Co. believes it is near a solution to the problem through the use of chemical spray.

To date experiments performed would indicate that it has many advantages over the cutting and burning method. Although comparative costs cannot yet be definitely determined, it is the company's opinion that the cost of spray treatment is about one-third that of hand clearing. A great deal of thought and study was given the selection of equipment used for the first time this year. It is believed the rig illustrated will travel the greater portion of rights-of-way and still be fast enough on highways to conserve time while going for water to mix with the chemical used. The spray pump is a "Friend," a 25-gal.-per-minute, 700-psi. pump, driven by a 16-hp. four-cylinder LeRoy gasoline engine. It is a compact unit mounted on steel skids along with a 300-gal. steel tank. Transportation is provided by a two-ton six-by-six army surplus truck with front end winch. The truck is driven down the right-of-way and two men handle each gun and a 100-ft. length of hose. A truck driver and pump tender complete the five-man crew. Two men on the hose are necessary because the brush must be sprayed from all sides.

The equipment had been operated 22 days this year up to late July. A little over 200 acres had been covered. Spray used amounted to 28,650 gal. of "Esteron 44." This is a Dow Chemical Co. product costing $6.55 per gallon in 50-gal. drums. For brush spraying a dilution of 400 to 1 is used. Most of the spraying done during the past two years has been with Esteron 44. This chemical does not control all of the obnoxious growth, but it is far cheaper and more satisfactory than the cutting and burning method. Experimenting is continuing with other chemicals but so far none have proved better than the Esteron 44.

Chemicals were first tried on Puget Power's rights-of-way three years ago by a contractor. Results did not come up to expectations or anywhere near claims of the contractor. They were, however, sufficiently promising to lead the utility to believe that chemical control had possibilities. It is now known that the wrong form of chemical was used and that it was applied to brush too old to give desired results. All further experiments have been made with the Esteron 44. It is a chemical containing 44% active 2,4-D as an ester along with a wetting agent. It is a liquid readily mixed with water. It is not harmful to animal life, is non-corrosive to equipment and very easy to handle.

Results the second year with the company's own equipment were more satisfactory. Pressure of around 200 lb. was used and efforts concentrated on brush not over 10 to 12 ft. in height. From this it was learned that higher pressures would give better penetration and also break the spray up into smaller particles. This gives a more thorough wetting of the plant. Proper training of personnel proved to be an important factor. An overdose of chemical is wasteful, but a sufficient amount must be applied to thoroughly cover the plant. In very dense foliage where the operator must pass through the growth in order to cover the back side, he should spray on his way out so as not to knock the spray from the leaves. He must not drag the hose over brush after it has been sprayed. It was also found there was a tendency to miss the tops of bushes and tips of higher limbs. To overcome this the operators pointed the spray nozzles at such an angle over the brush that a heavy rain-like fog settles over the plant. This, of course, is done after the bush has already been thoroughly wetted from underneath.

When experiments were first started three years ago it was believed that good results would be had only during the spring and early summer, the period of vigorous growth. It is now felt, on woody vegetation at least, that good results can be had by spraying any time after a good crop of leaves is on the trees and until the leaves start to turn color in the fall. Areas sprayed in September last year seemed to be as dead as those sprayed in July.

Esteron is not equally effective on all woody growth. Best results have been had on alder and willow trees. Maple and cottonwood have been the least affected by the 400 to 1 mixture. A waxy leaf plant does not seem to hold the chemical on the leaf long enough for complete absorption. Doubling the amount of chemical in the mixture has been tried in areas where maple is predominent and the kill seems to be much better.

Complete results from chemical control cannot be determined for several years, but, as indicated, results so far have proved very satisfactory.

New Street Light Maintenance Ladder Truck

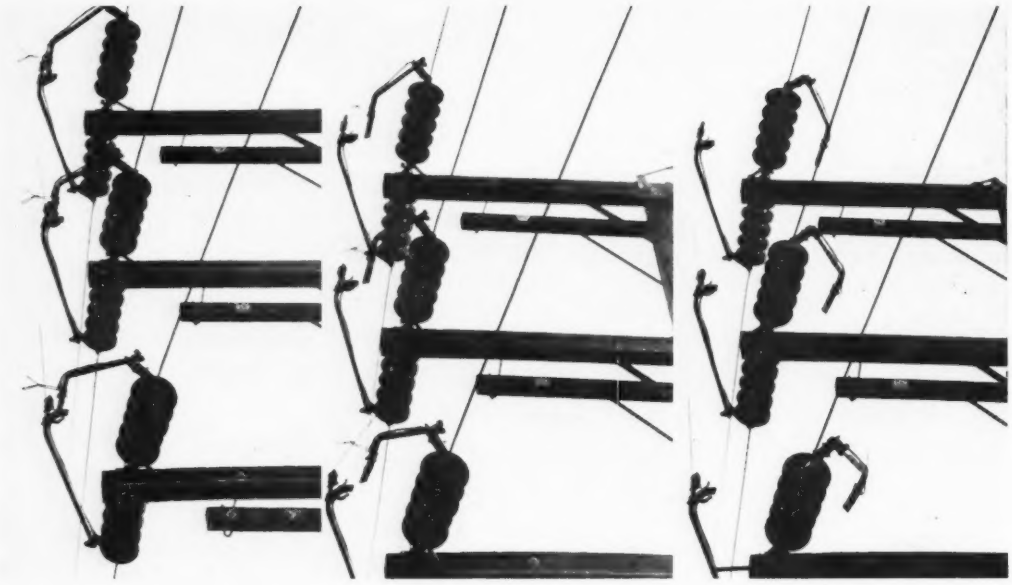
SOLUTION to the equipment problem of maintaining modern street lighting installations has been found by Southern California Edison Co. in the ladder truck illustrated. Twenty-four trucks of this type have been purchased for the various divisions.

The equipment was designed to maintain street lights 35 ft. high, which is the state standard for the south. The crow's nest ladder is of Edison design made by the Los Angeles Ladder Co. It will rotate 360°; operates with hand wheel brakes on rotation and elevation; will support 450 lb. when fully extended in the horizontal position. A safety switch on the ignition prevents starting the truck engine unless the ladder is in the down position.

Off-center mounting of the ladder was employed to provide more room in the truck body for supplies. Bins for supplies are also incorporated. Bodies are mounted on a 1½-ton chassis provided with two-way FM radio. In the accompanying views the upper picture shows truck at the curb with ladder extended vertically for "trimming" a lamp on a 12-ft. arm.

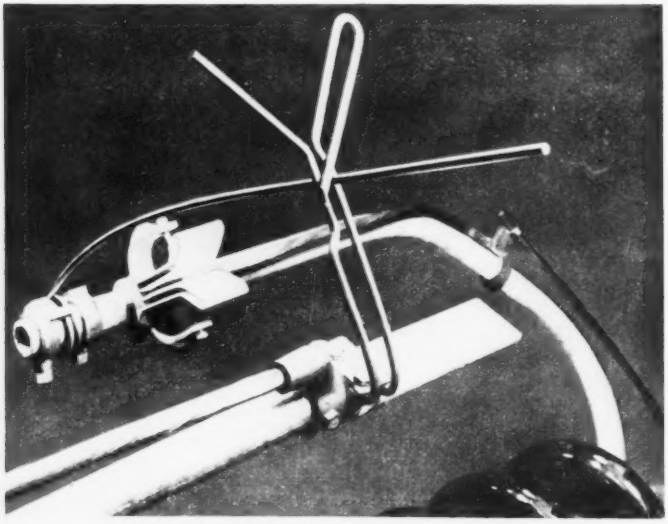
At center the truck is parked in the second lane with ladder extended over parked car to reach a lamp on a short arm. At lower left, equipment is shown in the traveling position. Another use for the equipment is shown at lower right. Here a man is seen working at mid-span on an aerial cable. Still another use, to show versatility, is for occasional tree trimming.

Crow's nest ladder extendible to 35 ft. mounted on 1½-ton truck with two-way FM radio solved problem of maintaining modern street lighting luminaires. Equipment is also used for tree trimming and for work on aerial cables



New Quick-Break Pole-Top Switch

Rotating type pole-top 69-kv. switch showing quick-break "cat's whisker." Upper left view shows switch closed. How quick-break is obtained is shown at center. Main contacts have opened and the quick-break rod is sprung as it slides out of retaining horn. Picture at right shows switch in full open position. The photograph below shows details of KPF Electric Co.'s quick-break mechanism



A new development in pole-top disconnect switches in the 11- to 69-kv. class is a quick-break device that greatly extends the field of application of air-break switches. As illustrated, quick break is obtained by a "cat's whisker" which bends in the form of an arc as the switch is opened and whips loose at high speed after the main contacts have parted. New switches are obtainable with the device or it may be applied to existing switches of certain types.

Southern California Edison Co. has purchased a number of these quick-break attachments made by the KPF Electric Co., for installation on 69-kv. switches of the same manufacture on its lines. Tests showed that, with the quick-break attachment, up to 40 miles of 69-kv. line can be opened or dropped, whereas, with the ordinary pole-top disconnect, the length of line is limited to six to eight miles.

Within reasonable limits, switches so equipped can serve also as load interrupter switches to open parallel lines. Another application is to lines on which there are capacitor banks. Tests have shown successful opening of an 11-kv. circuit on which there was 1,100 kva. in capacitors.

Low Power Factor in Industrial Plants—

and what to do about it

W. C. King
Los Angeles

X—What is the most economical form of capacitor?

Cost of different types

THE cost of a 150-hp. motor is considerably less than that of ten 15-hp. motors; that of a 150-kva. transformer is considerably less than that of ten 15-kva. units. But there is little difference between the cost of a 150-kva. capacitor rack and that of ten 15-kva. individual units.

It has been found most economical to manufacture capacitors in standard cells of 5 to 25 kva. For a large rack these cells are simply combined to give the desired rating. So the cost per kva. is about the same whether we use ten or a hundred cells.

Some of the more common forms of capacitors used in industrial plants:

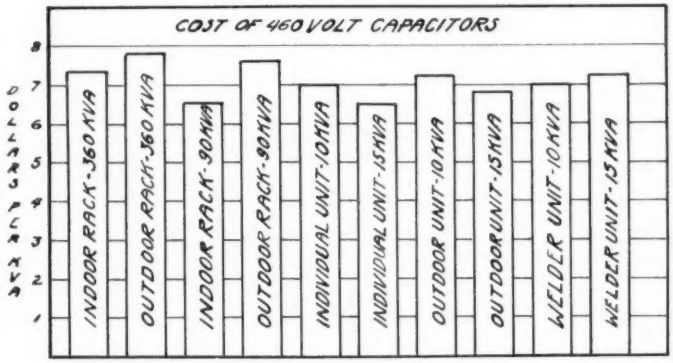
1. Large indoor type rack, 230 to 13,800 volts, 180 to 2,520 kva.
2. Large weatherproof rack for outdoor mounting; same ratings as for indoor type.
3. Dusttight racks for indoor mounting, 15 to 90 kva. at 230 volts; 30 to 180 kva. at 460 volts.
4. Individual box-type unit for indoor mounting, 5 and 7.5 kva. at 230 volts; 10 and 15 kva. at 460 volts. (Smaller ratings are available but are not used nearly as much as the larger ratings.)
5. Individual box-type units for outdoor service; same ratings as above.
6. Individual units for mounting on motor-generator welding sets for both indoor and outdoor service, 5 and 7.5 kva. at 230 volts; 5, 7.5 and 10 kva. at 460 volts.

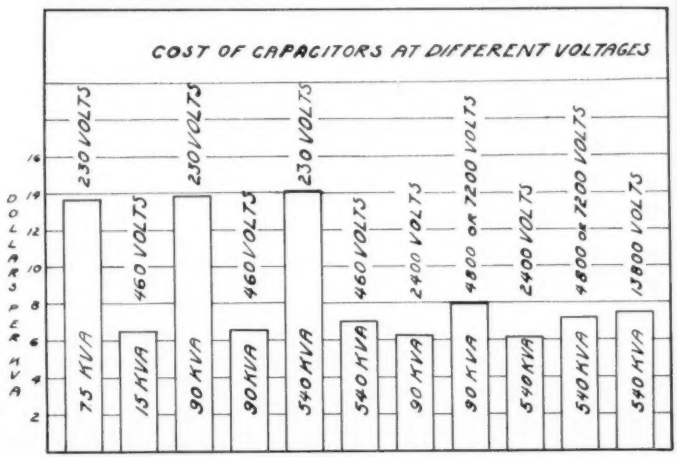
The accompanying chart shows the cost per kva. of various types and sizes of 460-volt capacitors. It brings out the rather small difference in cost, whatever sort of unit we are installing.

Note: There is a reduction in cost of 5% if the capacity ordered at one time is 300 kva. or more; a total of 10% if it is above 960 kva. This has been ignored in making up the chart as the reduction applies in the same way to a number of small units as it would to a large rack.

Effect of voltage on cost

The second chart shows the variation in the price of capacitors for different voltages. Except that the cost at 230 volts is a little more than double that of the unit designed for 460 or 2,400 volts, there is not a great deal of difference in the price of capacitors.





Cost of capacitors

The cost of 230-volt capacitors has led some plants to go to a higher voltage capacitor connected to the plant system through transformers. It is often found, however, that the cost of the transformers plus the power lost in them amounts to more than the saving in capacitor cost. A careful check should be made of the cost of the 230-volt capacitors and the transformer-capacitor combination.

The two charts shown do not take into account the cost of switches. This cost varies so much according to the type of installation that it would be impossible to make up a simple chart including it. For example, 15-kva. units might be connected to the terminals without switches, or a large rack with an expensive circuit breaker might be employed.

Savings may often be effected by dividing up the capacitor bank and using several smaller switches instead of one large one; for instance, a 180-kva., 460-volt capacitor will require a 400-amp. switch costing $98 while two 90-kva. capacitors will each require a 200-amp. switch priced at $38 or a total of $76.

This concludes the series on low power factor in industrial plants, and what to do about it.

NORTHWEST ELECTRIC LIGHT AND POWER ASSOCIATION

Utilization Data Sheet No. 59

SECTION: Commercial
SUBJECT: Two-temperature water heating
CUSTOMER: Buick Coffee Shop, Portland, Ore.
TYPE OF BUSINESS: Restaurant, 24-hour operation, 7 days a week
SERVICE COMPANY: Portland General Electric Co.
DATA PREPARED BY: L. S. Roof

Size of Business:
13 Booths
23 Stools
Customers Served Per Day: 600 to 800

Equipment Installed:
Two 52-gal. porcelain-lined tanks with separate thermostat for each 3-kw. element.

Tank No. 2 equipped with high-temperature thermostats.

Operating Data: (7-Day Test Period—March 11 to March 18, 1948)

1. Total amount of hot water used (7 days)	3,854 gal.
2. Maximum 24-hour draw-off (midnight to midnight)	688 gal.
3. Average amount used per day (24 hours)	550 gal.
4. Total electrical capacity installed	15.0 kw.
5. Maximum demand registered	10.7 kw.
6. Total electrical consumption (7 days)	1,010 kwh.
7. Average amount of hot water per kwh.	3.8 gal.
8. Average temperature rise (city water temperature 42.7°F.)*	105°F.

*City of Portland Water Bureau reports the average temperature of city water for the month of March 1948, was 42.7°F.

This two-tank, two-temperature, electric water heating installation, replacing manufactured gas, was installed in February 1948. A recording flow meter was installed at the cold water inlet and a seven-day record of the operation was obtained.

Remarks:

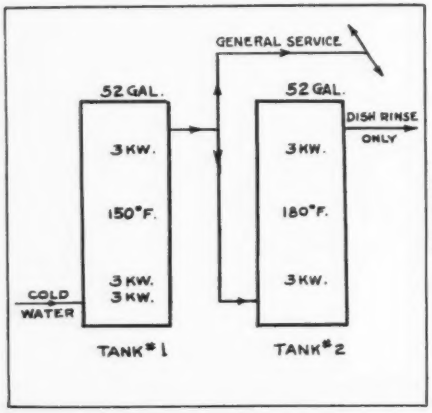
From the sketch, it will be noted that all general service taps are served from the low-temperature tank. The economy of this is easily understood as radiation losses of the higher-temperature water throughout the plumbing system would be considerably greater and much of the high-temperature water would have to be tempered with cold water to obtain a usable temperature. Also, the lower temperatures reduce maintenance of plumbing and faucet gaskets and lessen the danger of persons being scalded. Water temperatures above 150° F. will cause ordinary galvanized tanks to deteriorate rapidly, making it advisable to install tanks suitable for high-temperature operation.

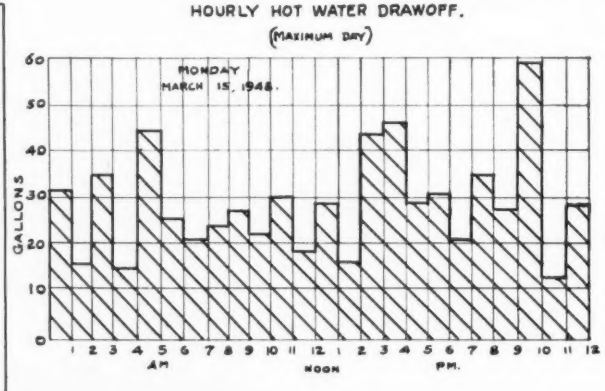
It is apparent from the operating data shown that the installation is undersize for the restaurant's maximum requirements, but physical conditions make it impossible to install larger tanks.

Dish washers soon learned to plan their work so as to have sufficient hot water; but, when a new employee replaced the man on the day shift, he ran out of hot water in the low-temperature tank the first day. The restaurant owner is not dissatisfied with this condition as he realizes it forces economy in the use of hot water.

Cost of operation is averaging less than $40 per month as compared to more than $80 per month for the gas water heating installation it replaced.

Two-tank, two-temperature electric water heating installation reduces radiation losses—shows savings over gas heating





ELECTRICAL WEST Sales Guide

News Letter

FOR THE ELECTRICAL MERCHANT OF THE WEST

September 1949

©

Feast to famine

All of a sudden there's a shortage of refrigerators, table appliances, clothes dryers, a few other items. Understocked, dealers suddenly started sending in orders, cleaned out stocks. Factories, caught with their production down because of the spring slump, are hard put to deliver.

Meter mate

Meter plans quickly cleaned out refrigerator stocks for Frigidaire, Kelvinator and others. Even Cola bottle dispensing meters are pressed into service. Being used in selling automatic washers also.

Shades of Reg. W!

In Portland, huge Meier & Frank broke with "nothing down on anything." Other big stores matched the deal. No meters needed, only a charge account. Small stores which can't take such credit risks are mad but impotent. Sears Roebuck previously announced $5 down, 24 months or under - $200 items, $10 on others.

Dishes get a break

General Electric's offer to salesmen making home demonstrations of its new portable dishwasher, plus its advertising promotion, have put life into the dishwasher business. Portables detour the plumber stoppage in areas where installation charge is excessive. Also can be sold to renters.

In Luxe

Horton bought out Jacob's Launderall facilities and will rename its automatic washer Launderluxe.

Maverick

Smart electric dealers cash in on promotion of gas industry. They say, "Sure, let's have an Old Stove Roundup, but what is most modern? - Of course its Electric."

Break into market

Leo J. Meyberg Co. broke ground Aug. 11 for a new branch house in Fresno at Los Angeles St. and Butler Ave. Its 23,000 sq.ft. will furnish space for warehouse, display, office, meeting room, self-service on parts and records. Lines stocked will be RCA-Victor, Norge, Bendix, American Central, Domestic, Eureka, Sunbeam and Manning Bowman.

Not Reno

If the FCC ban on give aways sticks, people may yet expect to buy appliances instead of hitting a jackpot.

New address

Graybar has moved to new quarters at 1750 Alameda St. in San Francisco, providing enlarged office and warehouse, appliance display rooms and customer parking lot adjoining the building.

Public Service of Colorado and dealers joined in an ironer demonstration campaign and also in home freezer selling, the latter prepared for a three-class training course by the Opportunity School staff at the company auditorium in Denver. — Hot and cold

Color for television hit the headlines again when RCA announced it had plans to enable broadcasts in color to be picked up in black and white on any video set, thus meeting FCC requirements. But color is still a year or two away. . . Set sales sprang upward in July, August and football telecasts promise a sales boost this fall. . . KGO-TV signed to broadcast all games at Stanford stadium. . . Hoffman will sponsor telecasting of all home football games of UC at Los Angeles and University of Southern California. . . Expect dumping of 7 and 10-in. sets as most makes will concentrate on 12½ and 16. — TV trends

On the West Coast Packard-Bell has appointed Paul E. Crowley to distribute its products in parts of San Francisco; William C. Miles for the southern half of San Francisco and San Mateo County; and Norris C. Teakle for the Santa Rosa area. — Three new ones

Big summer promotion on freezers started in the Denver area recently, backed by Utah Power & Light Co. and the Intermountain Electrical Assn., who are supporting it with heavy newspaper, radio, television advertising and direct mail. Before the campaign distributors met to work out a plan to help dealers with freezer sales. Then dealers got together for a freezer briefing at a dinner meeting ahead of the promotion. — Freezer push

Appliance dealers who sell on the installment plan will be able to set up bad debt reserves, according to a recent Bureau of Internal Revenue ruling. Before retailers could deduct from net income only the unrecovered cost of goods sold to defaulting customers. — Bad debt reserve

Universal announced a price reduction on its non-automatic waffle grill from $11.95 to $9.95. . . Announced production of its new electric floor polisher with twin brush action and fingertip control; also its "Budgeteer" clean air cleaner with six special cleaning attachments. — Universal news

O. A. Sutton Corp.'s new Vornado dual-action electric heater and fan converts from forced-draft heating to cooling action with the flip of a switch. Approved by Underwriters' Laboratories. Retails at $16.95. — Dual action

Leonard's new freezer line includes 6, 9, 12 and 20-cu.ft. models, all insulated with fiberglas, equipped with a thermometer to check desired temperatures. — Freezer line

Admiral is offering a 120-day price protection plan on its TV sets, stating that refunds will be paid distributors if recommended list, suggested dealer and distributor prices are reduced, and to dealers if recommended list and dealer prices are reduced. — Price protection

Through its Los Angeles distributor Sues, Young & Brown, Zenith displayed its new TV line to dealers at the Mayfair Hotel, Aug. 15-19. Brought out such new developments as the black picture tube, picture control switch giving a choice of circular or rectangular type picture, provision for receiving UHF channels on the present standard without a converter. — TV showing

TV viewers can watch programs from any place in the room without shifting the set or furniture with Tele-Turn, a new swivel-ring unit that fits all table sets. Made by Amplex Corp., the unit glides on nickel-plated ball bearings, is slipped between the set and table with the set resting on a steel supporting ring. Costs $3.95.

TV swivel

Lightolier is introducing a new collection of lead crystal chandeliers to retail from $75 and up. Line includes 28 different designs - pendent chandeliers, wall brackets, snug to ceiling fixtures, lanterns, etc. Will merchandise with national ads, picture portfolio for dealers and counter cards.

Light array

"Your Money's Worth in Good Radio and Television Service," an illustrated 16-page booklet put out by Sprague Products Co., radio parts manufacturer, gives detailed information about modern service facilities. Free booklet can be obtained from Sprague Electric, North Adams, Mass. — also details on how servicemen can get a supply for local distribution.

Service news

Admiral has a new table model radio-phonograph built exclusively for 7-in. microgroove records - Columbia 33 1/3 rpm. and Victor 45 rpm. Compact plastic cabinet is less than a foot square. Retails at $49.95.

For 7-in. records

Frigidaire is using a new fashion note in the interior design of its deluxe model refrigerators called Iceberg Blue. Color scheme provides a cool, clean-looking effect. . . Frigidaire's latest commercial model refrigerators are a 44-cu.ft. model with new forced air cooling units, and a 17-cu.ft. model.

Iceberg blue

Along with the introduction of its two new automatic coffee brewers Cory has sent out a promotional kit with catalog sheets, ads, a sales contest sheet, etc. for its jobber salesmen.

For selling

Current list prices on the Garod "Tele-Zoom" receivers and TV line have been guaranteed for distributors and dealers in a price protection policy. Prices will be guaranteed for a 120-day period and covers any new models to be introduced before the end of 1949. . . Garod is sending out dealer advertising aids and point-of-sale material to promote its TV line. Recently introduced a 16-in. direct view TV console receiver with 140-sq.in. screen, retailing at $389.95.

TV protection

"Music while you work" is the motto for General Air Conditioning Corp.'s 4½-cu.ft. refrigerator with radio mounted in the door. Refrigerator combination, with vegetable bin, is 23 in. wide, 20 in. deep and 44 in. high.

Radio-refer

Gibson is putting out two 8-cu.ft. refrigerator models, one at $229.95, the other at $269.95. Both will be promoted with newspaper ads and a tabloid broadside that will be dealer-imprinted. Both carry price protection.

Two refers

With its new "4-Pack" for incandescent light bulbs, Sylvania makes it easy for shoppers to see at a glance what size and type bulbs are inside the package. Wattage information is prominently featured on all six sides. 4-Pack contains two individual sleeves, each with two bulbs, so pack can be split.

Bulb pack

Lighting manual

Lightolier touches on all phases of selling lighting fixtures in its new 150-page sales manual. Discussions on showroom planning, mailings to contractor-dealers, letters to homeowners, selling the builder, Lightolier national advertising, dealer displays and its sales training program.

TV facts

Television article in the September issue of Better Homes & Gardens magazine answers such problems as where to put the receiver, what size screen to use, what kind of lighting to have, etc. Includes a discussion of present TV and its future possibilities.

New supplier

Admiral will step up its refrigerator production now that it has completed negotiations with Seeger Refrigerator Co. to produce refrigerator cabinets for the Admiral line. Seeger will produce about 50% of the Admiral cabinets, with Avco retaining the other 50%.

Record changer

Automatic three-speed single arm record changer, made by Milwaukee Stamping Co., is being introduced and distributed nationally by Comet Corp. of Chicago.

New model

Norge has a new 6-cu.ft. refrigerator equipped with the Norge Self-D-Froster system, which will sell at around $200. Side freezer holds up to 17 lbs. of frozen food.

Controlled air

Fresh'nd-Aire has started shipments on its new Heaterette, with a three-way switch permitting its use as a heater-fan or a fan only. Unit is mounted on U-shaped legs facilitating control of the air flow in any direction.

New lamp

Westinghouse announces a new lamp to bring the ultraviolet biological ray indoors by means of the Westinghouse fluorescent sun lamp tube made to fit the 20 and 40 watt fluorescent fixtures. California Ultraviolet Co., San Francisco, will distribute the lamp through regular wholesale-dealer channels.

1950 line

Apex's 1950 line includes the Dish-A-Matic customized unit and sink, three new Wash-A-Matics, an automatic clothes washer with the "bouncing basket," and a complete line of newly designed Spiral Dasher conventional washers.

TV and radio

In the television field John Mack Industries is putting out its first floor models - two consolette sets, a 12-in. unit retailing at $249 and a 16-in. receiver at $299. New table models are a 16-in. set at $279, a 12-in. receiver at $219 and a 10-in. set at $179. Its latest addition to the radio market is a five-tube model with built-in loop antenna at $14.95.

More models

Some additions to Emerson's TV line include a table set with 12½-in. picture tube listing at $299.50; a console model with 16-in. tube at $449.50; a 4-in-1 table model receiver with TV, AM-FM, and an adapter unit for plugging in record players to retail at $269.50; a 10-in. TV receiver to retail at $199.50, housed in a table model cabinet; a 7-in. model to retail at $129.95.

Three-in-one

Three-bulb cartons for its light bulbs have been introduced by the lamp division of Westinghouse. All popular size bulbs will be packaged this way.

ELECTRICAL WEST

Sales Guide

FOR THE ELECTRICAL MERCHANT OF THE WEST © SEPTEMBER, 1949

Why Sell CLM?

Do you know the quality selling features of Certified lamps? They are potent selling material to use in assuring your customer that CLM lamps mean quality merchandise. Know them and use them.

1. All parts of a Certified lamp are durable and carefully assembled. Both the reflector and shade are firmly mounted.

2. The Certified reflector is used only in Certified lamps. Its glass diffusing bowl, with metal reflector, is unique in design and construction. It provides more and better light on a reading plane.

3. All lamp shades are Certified and designed to use with a particular type of Certified lamp. Certified lamp shades are constructed to give an adequate amount of light and to eliminate glare. They are made of materials that withstand humidity. All Certified shades can be identified by a special tag of Certification.

4. Each of the several types of Certified lamps is designed to use a specific size of multiple filament type bulb to give the best lighting performance.

5. Certified table lamps have a diffusing disc around the base of the lamp bulb to prevent reflected glare from polished surfaces.

6. A special switch is used to obtain the two levels of light provided by all Certified lamps. It carries the approval of Underwriters' Laboratories. On combination incandescent - fluorescent Certified lamps a separate switch operates the circular fluorescent tube.

7. In Certified lamps with circular fluorescent tubes a radio noise suppressor is installed to reduce possible radio interference in the wiring circuit.

8. Certified lamps are constructed so they will not fall over if tipped as much as 7° in one direction.

9. The bottom of the base on a Certified lamp is smooth to prevent scratching.

10. The CLM lamp cord is adequate length (at least 7 ft.). It is insulated with plastic for durability and appearance. The cord is composed of fine copper strands to insure flexibility and long life. Stress relief for the cord is provided in the base of the lamp.

11. The socket on a Certified lamp is secured to prevent twisting when it is inserted or removed from the lamp.

12. To avoid fire and shock hazards all soldered joints on a Certified lamp are covered with both rubber and friction tape or with approved connectors.

13. All wire-ways on the CLM lamp are

smooth so that wires will not be injured. The electrical insulation throughout is such as to make electric shock improbable.

14. The possibility of the ballast overheating is eliminated by adequate heat dissipation.

15. All parts of the stem are in proper alignment on a Certified lamp.

16. The light output of the CLM lamp is at least 65% of the bare lamp. Light provided on the reading area averages 45 f-c or more.

Every Certified lamp has been built to meet these quality specifications, providing better mechanical construction, electrical safety and superior lighting performance.

Certified lamps are approved and endorsed by the industry. Establish yourself as a quality retailer by stocking and promoting the lamps with the Certified tag.

Use Handbill Advertising

Says Ken Hampton

Handbill advertising was used long before Columbus discovered America but has recently been somewhat frowned upon by advertising men.

Handbills, however, are among the least expensive advertising media and are something of a natural for small retailers. They are completely controlled by the advertiser and are not only local but are flexible in time of use.

Handbills are easy to plan. They offer few layout problems, can be readily printed and distributed to specific markets at low cost.

The following points should be observed in preparing handbills:

1. Layout should have an attention getting headline—plenty of pictures should be used and one main product featured at a bargain if possible.

2. Careful planning should go into the area to be covered and the method and time of distribution.

3. A definite locally appealing copy slant should be used.

4. Use a test device, such as bringing a coupon to the store, etc.

5. Careful planning should go into the merchandise offered. Offer products that are seasonal or in demand because the purpose of a handbill is to stimulate buying, not to create demand.

Many firms use one or more handbills each month, others use them for special seasonal events. They are especially good for special purchase sales or special events such as store anniversaries or Mother's Day promotions, etc. Often they are used to make premium offers or to announce contests.

The public for centuries has learned to look to handbills for special events. This makes them a particularly good media in which to offer close-out specials, bargains, special store demonstrations, etc.

Handbills certainly should not be looked to to answer the whole advertising need of any store, but they do have a definite place in helping solve many store problems. This is particularly true of neighborhood stores in big cities, stores in small communities having no local newspaper or radio broadcasting station, stores in any location wanting to reach a certain part of the market—all can use handbills economically and to great advantage.

Advertising will play a big part in all electrical appliance merchandising during the last half of 1949. The store that makes careful, consistent use of advertising from now on will take less volume drop this year and be in a position to make a better profit in 1950, for this is the year we run into the possibility of proving the old saying that "If you don't advertise, the sheriff will."

Dragerton, Utah, a smokeless, clean, coal mining town, whose homes are each equipped with modern electric appliances

Coal Miners' Wives Demand Electric

COAL miners may have a coal ideology and follow their leader, John L. Lewis, without question. But coal miners' wives want no more coal stove cooking and don't mind saying so—yes, even fighting for electric.

Coal mine labor troubles again recall this ironical turn of events in Dragerton, Carbon County, Utah, where coal miners' wives defied the union and demanded electric ranges, water heaters, refrigerators and oil-burning furnaces. And now this coal town is the cleanest coal camp in the country, its 745 homes and 40 apartments each equipped with a Kelvinator range and refrigerator, a Fowler 40-gal. water heater, an oil-burner and 120 with Bendix automatic washers.

The town was built by the Defense Plant Corp. to house coal miners engaged in coal production for the operation of the Geneva steel plant. Its houses originally were equipped with coal stoves and coal burning furnaces. When the U. S. Steel Corp. purchased the Geneva plant it also acquired the town's houses and added more to those already built. In this program of modernization it decided to re-equip all the homes with modern electrical equipment, and remove the coal-burning stoves and furnaces.

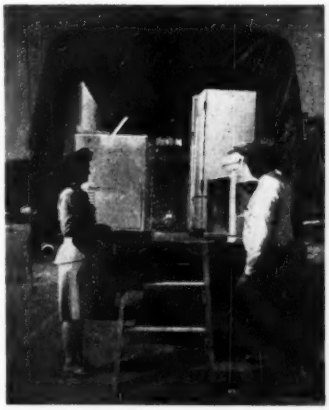
The United Mine Workers local protested vigorously and demanded that the coal burning equipment be reinstalled. The company then agreed to reinstall coal stoves when a request was made. One hundred changes were requested but, when the equipment was moved to the homes, the women refused to allow them to be installed. The union then circulated a petition among its members and passed a resolution demanding that the members refuse to use anything within their homes but coal in order to protect their future.

Housewives, however, organized a counter movement and 57 signed a letter to the *Dragerton Tribune* declaring "we really feel that this is taking liberties with our way of thinking and living." In their letter to the paper they said: "Most of our husbands are miners and good union men, so rather than embarrass them with this problem, we have decided to take this opportunity of saying that we want all of our home conveniences left as they are, and we will fight to keep them that way."

Requests for help came to Utah Power and Light Co., serving the area, through its home service department. Meetings were held then and it was explained to the coal miners by company officials that they were using a great quantity of coal in the making of electricity and thus delivering the energy from the coal to their families in a cleaner and more efficient way. They would still get the labor out of it.

So the electric equipment won out. To follow up and acquaint the women with the ways to use it efficiently, a series of cooking schools and demonstrations was held in Dragerton. These were well attended. Mrs. Mary Black, home service adviser of Utah Power and Light Co., and Miss Josie Stewart, home economist of Flint Distributing Co., demonstrated the use and care of the electric range and water heater. As the town also contained a number of Mexican families, special cooking demonstrations were held there for the benefit of the Mexican housewives. Mrs. Black conducted these meetings with the assistance of an interpreter and leaflets covering *Tips for the Use of the Electric Range* were printed in Spanish and distributed to those in attendance. H. G. Barton, dealer sales representative, and W. L. Faddis, division sales manager, also participated.

Thus it is that Dragerton claims, with justifiable pride, that it is the cleanest coal mining town in the country. Progress won out over outmoded union rules.



Portable sales room is used by Northern Furniture Co., Garland, Utah, to take its appliances into rural areas of the district. Prospects merely step into the mobile shop as it comes around to their homes and choose the appliances they want. The store also pre-freezes ice cream, frozen foods and meats, puts them into a freezer on the truck to sell to farm customers. The show room was developed by R. N. Campbell and Jerry McFadden of Nothern Furniture Company. Mrs. Campbell and Mr. McFadden view the display

Echoes From

SPRINGBOARD as it is for launching new models, policies, ideas, sales programs, Market Week is more significant in these aspects of it than in the actual happenings or speeches. Market Week, at Western Merchandise Mart, San Francisco, Aug. 1-5, was significant for these things:

Jim Nance, president of Hotpoint Inc., at a press conference, announced a new program by Hotpoint to inspire utilities to get back into appliance promotion on a big scale again, not necessarily by direct selling, but by campaigns and sales activity. In his appliance dinner address Nance turned most of his attention on appliance salesmen. "For my money the factory still works for the salesmen." Recruits for sales forces, he observed wisely, promised more from eager high school graduates than college men. The latter, surveys showed, were more interested in being big shots or having social security. "Maybe if we catch them young enough we can find them before they get these social security notions," said Nance. The country needs 150,000 vigorous young men to go out to homes and sell appliances if the products of America's factories are to be sold and its workers kept employed.

Pictured, top: Bill Lee, Sherman Clay, appliance dinner chairman; James Nance, Hotpoint president, speaking. Packard-Bell in person—Joe Spain, v-p.; Paul Crowley, Bill Miles, distributors; Hubert Bell, president. G-E's new short disposal for high plumbing explained by L. R. Montgomery, G-E Supply, to Carl Bengtsson, Maxwell's. New low-priced New Home shown Jack Zink by T. Carroll Dramer, district manager, and to Ray Houck, Falks, Boise

S. F. Market

Gas industry launched its "Old Range Roundup." After Julius Klein of Caloric Stoves had extolled CP gas ranges, Nance neatly turned the pitch by commenting, "Sure, round up all the old gas ranges, but go all the way, replace with electric." There's a hint in that to electric range dealers to take advantage of the Old Range Roundup publicity to sell electric.

Buying trend was significant too. Attendance at the market, said Frank Runyan, Mart president, was higher than any previous summer market. Buying was active, indicating dealer inventory has been brought down. Nance said at press luncheon that earlier dealer buying strike had put manufacturers in bad position to judge production quotas but now buying will get immediate response at manufacturer level. Prices for white goods seem to have taken all the drop they are apt to.

Television showed a definite trend to bigger picture tubes, several, such as Zenith, Magnavox, others will offer nothing smaller than 12½-in. or 16-in pictures. Portables in TV sets were featured by G-E, Motorola, Emerson, others. Prices of 7-in. sets are likely to take a big tumble as many lines unload.

Top: Proud of new 2-oven, 6-unit L & H range are Al Lindemann, president, and Carl Savasta, distributor. Nat Nigberg shows new Western product, Ultra-Cold range-refrigerator to W. Phillips. Herb Atwater, Meyberg Co. and home economists, Ardith Osborn and Frances Alexander, with new Bendix Economat. Lorraine Beneke, McCormack & Co. home economist, demonstrates Admiral range with Rotiss-o-mat revolving spit for automatic home barbecuing

Four top-notch salesmen (right) introduced by Clark Chamberlain (left) set the pace for a top-notch sales stimulating conference, from beginning to the end

Dealers' Notebook on San Diego Conference

Manufacturers' men lined up for a star feature; five-minute pitches on new products, prices, policies, publicity, hot off the factory, competitive, service

Kidding the liquidators and the price cutters, a clever skit by Dan Turner; acted by Alan McCutcheon, sheriff; Ben Hurt, credit man; Florence Orth, Mrs. Stung B. Fore; Aubrey Thompson, salesman; William Hallenbeck, liquidator

So much good stuff, all of it, nearly everybody took notes, or wished he had. Such was the annual summer conference of the Bureau of Radio & Electrical Appliances of San Diego County, recently. J. Clark Chamberlain, manager and head showman; A. K. Chamberlain, president; Jess Zweiner, vice-president and Bob Redfield, program chairman, had built a fast "show" from start at 12 noon to prompt close at 9:30 p.m. Some 44 people talked, acted or meced. It went on split second timing.

But to remember the ideas, thoughts, hints and kicks that came with machine gun speed from speakers and skits, notes are necessary. Such notes from such a conference should be helpful to *any* dealer, anywhere. So here is a set of notes for you. For those attending they'll recall the full talk. To others they'll bring the meat of it.

A. E. "Doc" Holloway, now president, San Diego Gas & Electric Co.—The industry still growing . . . population still coming, though down 15% from wartime rate . . . new home construction still active . . . 3,700 new customers connected first six months . . . backlog of only 1,200 now to serve which means faster service can be promised . . . many system improvements will prevent shortages this winter . . . rural electrification program is nearly complete . . . customers using more electricity, from 1,340 to 1,810 kwh. per year average. Everything points to a continued good market for dealers in appliances.

Four star salesmen, each a hotshot in his line—

Norman Anderson, Griffin Appliance, Chula Vista—While most people try to bring customers to the store, we take ours to the customer. A moving van was converted to a store on wheels. It rolls up the residence street in front of house, creates interest and curiosity. Prospects are invited into van to see. You can get on more intimate terms with cusomers, find out what appliances they have, what they need, you get invited in to see and check. You would never have known what they needed otherwise. Here's my slogan, "They're more likely to buy it if you let them try it."

Joe Pfeffer, Sears Roebuck—Sears has a 3-point program: (1) increased advertising on freezers, (2) promotional deals, (3) more service to customers. The deal is an offer of $20 of frozen food with every large freezer. Whenever a call is made on a prospect I canvass the whole block for more customers; talk the 5-year service guarantee, advise where to buy food in quantity at bargains for freezing, put the name on the university list for booklets, refer customers to power

company home economist for instruction on preparation of food for freezing. After a sale continue to show interest in customer's use and enjoyment of freezer. Night and day service very important. These methods brought a 300% freezer sales increase over 1948.

Lee Karns, Home Appliance Co.—My baby is television. There's no magic formula. Sell good, dependable reception. People want to buy pictures, not a cabinet or tubes. In San Diego, sell local reception. Be enthusiastic, it is a big factor. Know one or two featured programs and talk them enthusiastically. Know TV events so you can talk them up. Be a booster for programs, and TV sets sell themselves.

Mike Carr, Harringtons—On washing machines there's a great story on how to get out of doing work. Women ask, "Can I go someplace and still have my washing done?" Question prospects as to what they want, classify them and turn on the enthusiasm.

Dwight Thomas, sales counselor—"How Sales are Lost." Recent analysis by a large group of salesmen as to why they lost sales brought these reasons: (1) Didn't know the product thoroughly. (2) Didn't properly analyze the prospect's needs. (3) Lack of enthusiasm. (4) Did not ask for the order. (5) Didn't have right mental attitude, forgot selling technique. (6) I am a poor closer. (7) Improper use of high or low pressure. (8) Got into arguments when I ran into objections. (9) Talked myself out of the order. (10) Interrupted prospect while he was talking. (11) Disrespected prospect's mood. (12) Something in appearance or action annoyed prospect. (13) Failed to keep an appointment. (14) Did not show the complete line—sometimes it is necessary, other times not. (15) Let the prospect put me off with a weak excuse. (16) Did not sell benefits or end use of that appliance. (17) Did not follow up.

A salesman's seven deadly sins are—(1) Disloyalty to self and firm worked for. (2) Lack of enthusiasm. (3) Failure to emphasize benefits or profits. (4) Failure in self management. (5) Ignorance of product and of selling principles. (6) Poor health; lack of desire to do a job. (7) Lack of merchandising ideas.

How to achieve greater selling effectiveness—(1) Have a comprehensive plan for selecting salesmen, one to dig behind the front and see the true individual; job analysis and specification of what salesman needs for the job; multiple interviews, no flash judgments; checking of references; aptitude and other tests; credit and financial information; health check. (2) Training for orientation in your organization; in products; on-the-job training with a good salesman. (3) Analysis of salesmen each six months; continue training and to see if doing right by the salesman. (4) A sound compensation policy. (5) A definite store policy. "You are the boss. These things must be done by you. They are a responsibility toward the salesman. They will develop unused capacities. Sit down often with the man and his wife for private conferences to straighten complaints, suggest improvements."

Harry Gough, General Electric Credit Corp.—A prescription for preventive credit medicine, to insure sound, healthy and prosperous condition—Ratio of business on credit shifting back from 75% cash, 25% credit to prewar 75% credit, 25% cash. Means 75 to 80% of your business; three out of four customers. The four C's of good credit—has the customer (1) the character and reputation to pay; (2) earning capacity to pay for this and his other obligations; (3) capital to make a down payment; (4) do the conditions in his case and in the community warrant this size purchase on the terms recommended?

Milt Sanders depicts history's famous salesmen—Christopher Columbus, Sir Francis Drake, John Adams and "you"

Two fundamentals—(1) Be sure you obtain enough down payment to insure a margin of protection for you as seller and a sense of ownership for the buyer. (2) Be sure that you obtain sufficient monthly payment to more than compensate for normal use and depreciation.

Past experience on repossessions was reasonably satisfactory provided terms did not exceed 10% down and 24 months maximum. Repossession rate increases alarmingly as terms are lowered.

What made term selling profitable for dealers?—(1) Sufficient down payment; some cash in addition to trade-in. (2) Follow-up of customer after appliance purchase and delivery to make sure of satisfaction. (3) Personal review of all past-due accounts with financing concern so prompt action can be taken on collections or repossessions. (4) Trained salesmen in the fundamentals of good credit selling, getting proper information, large down payment, conservative terms. (5) Advertise "easy terms" rather than special down payment or minimum payments. (6) Make sure sales manager does not have veto power over credit department. (7) Make sure credit manager or financing company did more than just reject credit; tell what would be sound basis for the deal, even if 100% cash. Often it can be sold. (8) Handle no more than two or three lines of standard brand merchandise and follow sound merchandising policies.

Salesmen (it means 75% of their income) should pay special attention to—(1) Making it clear to customer what the appliance will and will not do. (2) Obtaining adequate credit information, most of it while making the sale—and get it accurately. (3) Explaining importance of making payments promptly and setting the payment dates with the customer. (4) Making sure names and addresses are correctly spelled. (5) Closing sales, not on most liberal terms but asking how much it is convenient to pay and to budget monthly.

The dealer panel (Tayler Brown, Clarence Heard, Robert Helland, O. K. Hope)—The appliance business is a wonderful business, and we like it, except for (1) service on automatic washers, (2) poor assembly and inspection of appliances by manufacturers, (3) damaged in transit, (4) time wasted by manufacturer and distributor salesmen, (5) television set troubles, (6) poor service on parts ordered, (7) plastic parts that break or warp. Later in the manufacturer's quiz (reported mostly in last month's News Letter), comment by factory men showed they had felt the sting but took it as constructive criticism.

Other features of the program—Paul Mowrey, TV director, ABC network, reviewed the television situation with reference to the San Diego area. W. Hubert Tappan, Tappan Stove Co., told of the gas industry's "Old Range Roundup." E. D. Sherwin spoke on behalf of PCEA. Stanley B. Grove, San Diego Chamber of Commerce manager, talked plain talk about the city's needs. Two bits of entertainment—A burlesque on lazy "selling" by Prof. Quarterwitt, played by W. A. Cyr, ELECTRICAL WEST; a clever skit spoofing liquidation selling (see picture). Short pep talks from Fred Fenton, Easy Washing Machine Co.; T. J. McIntire, U. S. Grant Co.; Sam Scott, Graybar; Steve Maher, General Electric Appliances, Milton Sanders, L. J. Meyberg Co., wound up the entire conference by proving that civilization was due to salesmen.

ELECTRICAL WEST

Swing Your Partner

YES, sales promotion is back again. The few hardy utility companies with power for sale last year are not alone now in the dance for business. The wall flowers are joining the festivities and swinging their partners — the dealers, contractors and distributors—to the lively tunes of advertising, sales campaigns, promotions and programs.

High time, too, for competition, such as LP gas, has made much hay while the electric utilities have dreamed in the haystack. Let no one say that a monopoly has no competition, hence needs not promote. Many substitutes have a good sales story too. Even more dangerous to the industry's growth would be a public attitude that it was using all the electricity it needed now, why bother with any more.

Yes, enterprise is at work again. Last year it was spent in a desperate drive to provide more generating capacity. Now it must turn to selling the surplus that it is building and to keeping the revenue steady from the load already connected.

Check and Double Check

IN a Sunday afternoon radio thriller about spies and sabotage Admiral Zacharias frequently asserts that the American industrial machine is as vulnerable as a picnic lunch is to ants when it comes to infiltration by saboteurs. Anyone familiar with the electrical industry in all of its diverse operations would have to agree with the admiral. This vulnerability is especially true of those organizations in the industry manned in part by people associated with some of the radical left-wing labor unions. Such a condition exists in the manufacturing and communication fields to a marked degree and to a lesser extent in the power field.

Because of the essential character of their service in time of national emergency, the power and communication utilities would naturally be prime targets for sabotage both from without and within. Why not then subject the people who staff these important facilities to the same sort of loyalty check that has been applied to government people and university teaching staffs? There are agencies equipped to screen people quickly as to affiliations with questionable organizations. Were we a utility executive we would be inclined to submit our employee rolls from top to bottom to such a screening process. And we would fervently hope that the lists would be returned with every name cleared. The conviction that such a screening is necessary and vital at this time stems from a remark by a well-informed utility man. He says: "In times like these none but tried and true Americans should man our outposts."

Lighting's Big Task

AS fall ushers in the lighting season, it is good to see action on many fronts to develop the lighting market using the industry's Planned Lighting program. Industrial lighting grew tremendously during the war and that acceptance still affects new factory lighting. In the surge of store modernization and redecorating following the war, commercial lighting has flourished. Cities that felt the blackout or dimout have reacted in extensive programs of new street lighting. School lighting too has blossomed despite budget limitations and conservatism. An outstanding case is described in this issue.

But the home has been the neglected field of lighting activity. Dealers may not like the thought but it is true that when the utilities stopped promoting and even direct selling of adequate illumination sources — IES lamps, kitchen lighting fixtures, fixture adapters — home lighting sagged badly. It has even retrogressed. A glance at the types of floor and table lamps being offered the public by home furnishings stores, where most lamps are bought, reveals a slide back to old pre-IES standards. The Certified Lamp Manufacturers have tried to follow through with the original program but they badly need support from the utilities and electrical industry. The lamp makers who are getting the business now care nothing about lighting performance. They play on style alone. And the style prevailing is anything but good for *seeing* purposes, though it may be good in *looks*. Home lighting fixtures have improved some, but few if any people are selling them on a basis of lighting and seeing — only on appearance.

EDITORIAL VIEWS

Hence, while no letup should be made on the promotion of planned lighting for factories, offices, stores, schools and streets, certainly much much more should be done to save and to develop the biggest market of all, home lighting. It is also the biggest revenue market, the most stable in good and bad times. It needs help.

Wholesalers to Distributors

SO now they are electrical distributors! The National Electrical Wholesalers Assn. has so decided and will change its name to National Association of Electrical Distributors. Hence the rugged branch of the industry first known as jobbers, and then wholesalers, now becomes distributors. However, it must excuse the others of us who slip once in a while and still call them by a former nickname. (Just so long as it is not a so-and-so, eh?)

Reason given is that jobbers used to sell in job lots. By that token, wholesalers sold at wholesale. There will be contractors and dealers who hope they still adhere to a wholesale-only policy even if they are known as Electrical distributors.

But by any name they choose to be known, the Electrical wholesalers—(excuse us, distributors)—are an indispensible and a well-liked part of our total electrical industry.

It Could Happen Here

ONCE an industry is socialized it will not easily get out of the bureaucratic net. Experience with England's nationalized industries shows this to be a fact. Even the Conservative Party recognizes this. Here is how the *Electrical Review* comments on the situation: "In the statement of policy issued by the Conservative and Unionist Central Office it is recognized that electricity at least cannot be denationalized and so any future Conservative Government must confine its endeavours to improving the nationalized industry. It will secure this improvement by a greater measure of Parliamentary control and by decentralization of functions." This sounds like the U. S.—the "outs" promising to do better the things initiated by the "ins."

ALL is not clear sailing for C. Girard Davidson, assistant secretary of interior and the administration's spokesman on the proposed Columbia valley administration. On the contrary, it appears from dispatches coming out of the congressional hearings on HR 4286, the so-called Mitchell or administration bill, that some of the congressmen are asking some embarrassing questions. And Mr. Davidson, fluent and enthusiastic as he is about CVA, is having some trouble answering them. For example, Davidson was asked the other day why a region-wide referendum should not be held on the proposition to turn Pacific Northwest development over to three CVA directors . . . He said in effect that it was the business of Congress, not the people of the region, to determine what is good for them in the way of an authority to direct basin development. He said an election would not square with our republican system of doing things and the really "democratic" way to handle river development is through a CVA-like authority (another splinter government, we call it) with widespread and arbitrary power over water, power and land resources. Well, maybe so. But that isn't our idea of democracy in action. Secretary of the Interior Krug didn't help Davidson any when he told the house committee that the CVA proposal "is too complex a matter for the people to act on intelligently." Alexander Hamilton expressed the same idea, but less crudely, when he said in effect that a few choice spirits should rule these United States. The simple fact is that Krug, Davidson, Mitchell and other CVA enthusiasts simply couldn't afford to submit their CVA proposal to a referendum in the Pacific Northwest. They're smart. They know that if it did come to a vote in the region today, it would be voted down in every affected state, with the possible exception of Washington, public power stronghold.—Portland (Ore.) Journal.

Purdy Copithorne Groth Grauer Autrim Montgomery Hayes

Northwest Group Studies Accounting Practice

An innovation in programming the recent annual conference of the Accounting & Business Practice Section of the Northwest Electric Light & Power Assn., at Vancouver, B. C., was introduced by Frank Copithorne, B. C. Electric Railway Co., section chairman. The entire program of the meeting was built around a case study of the procedures of the B. C. company, the discussions taking place after a half-day tour of the company's accounting plant.

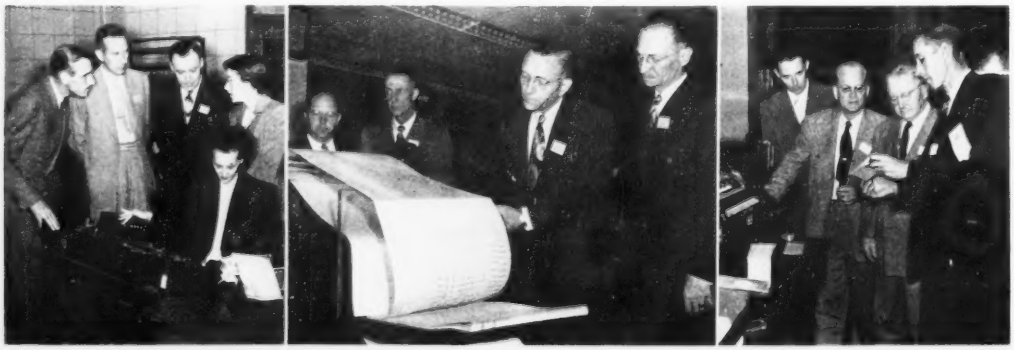
Interest of the 70 delegates attending the meeting was divided between the company's well-developed budget-control system, and the operation of the tabulating department, where all billing, general accounting and statistical work is handled by IBM equipment. Discussions on the following day and a half gave delegates from the several companies an opportunity to measure their own procedures in relation to those of B. C. Electric.

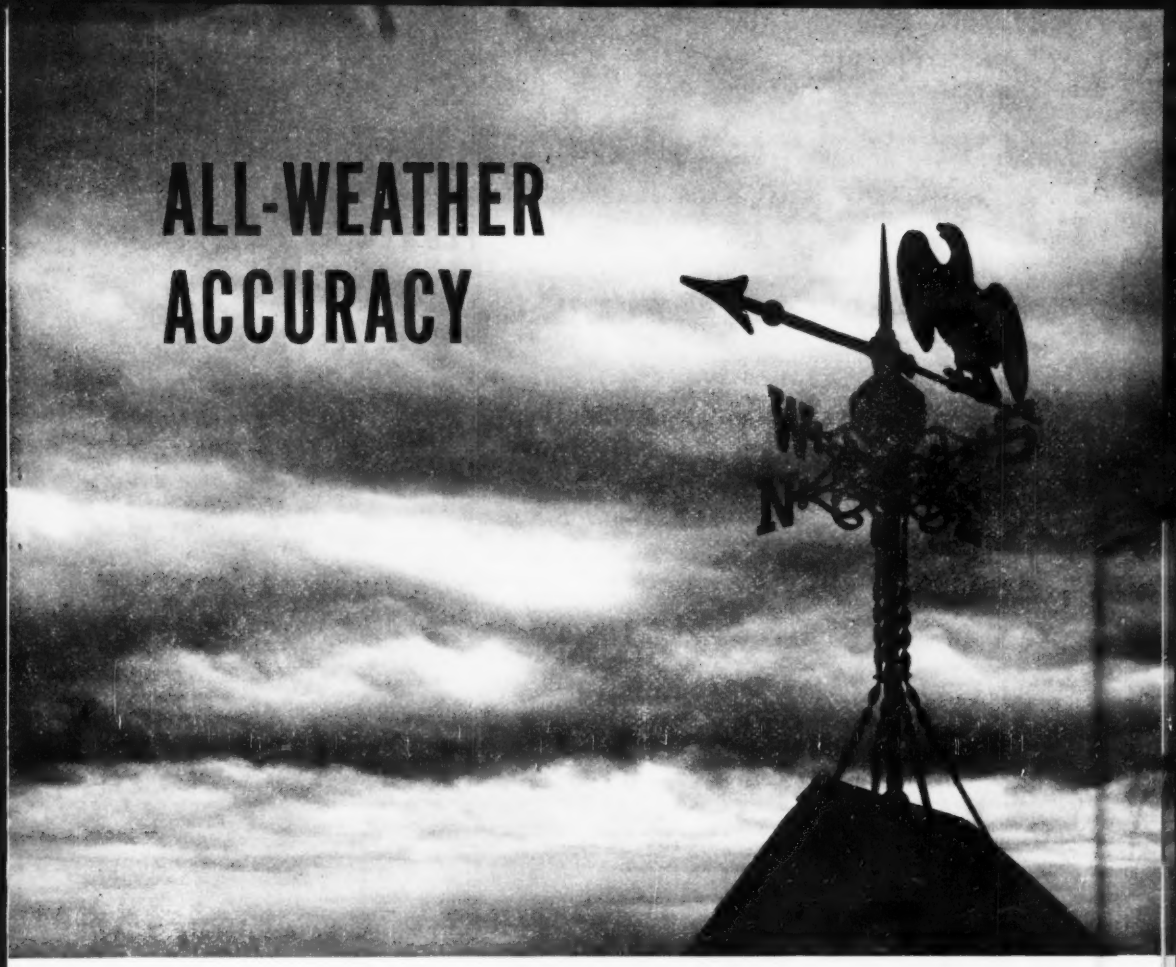
Laying the foundation for the case study, A. E. Grauer, president of the company, described the postwar reorganization of his company, citing as a need for a general overhaul the great growth of the company territory in the war and postwar years. The old top management policy of direct control meant that some matters were subjected to most careful scrutiny, while other matters of greater importance escaped attention. The first big step was to develop an organization capable of handling the increased size of the company without overburdening any part of the managerial structure. This meant the strengthening of some divisions and the creating of new divisions or departments, and the delegating of direct responsibility, he said.

New departments established during this period were: a public information department to correlate all the many phases of public relations; a research department to report and interpret to top management all the staff operations, and an industrial relations and personnel department to handle the more complex employee relations developing in recent years.

Dr. H. L. Purdy, director of research and administrative controls of the company, outlined the functions of his department with particular reference to budgets. The principal uses of the budget system, he stated, were (1) planning and forecasting, (2) coordinating the company operations, and (3) control which measures results and assigns responsibilities. A

Elder Smith Tye Halliday Dodson Oliason Smyth Porter Field Snow Gardiner





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The Alnico magnets used in J Meters have great power to resist the demagnetizing effects of lightning. They are clamped between aluminum frames which provide a conducting shield to further assure unusual freedom from loss of damping force by any cause. Sangamo J Meters are fully compensated for temperature extremes and accurately measure all power delivered at sub-zero or torrid temperatures.

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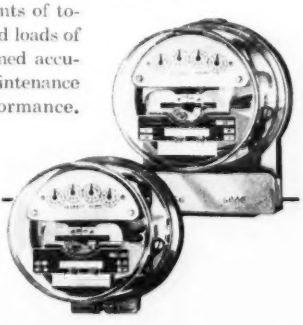
Sangamo J Meters have proved their ability to meet the requirements of today and the anticipated loads of the future with sustained accuracy, economy of maintenance and troublefree performance.



50TH ANNIVERSARY SANGAMO 1899 - 1949

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revision of the codes of accounts into "cost centers" where responsibility for costs could be assigned to a supervisor or department head, resulted in pinning responsibility down so that control could be exercised. This phase of the operation was explained by Allan J. MacDonald, assistant to the director of research.

An important step in making the budget control system effective is the prompt reporting each month of the cost of various breakdowns of operation to the department head or supervisor responsible. These monthly reports are scrutinized by the supervisor and his foremen and returned through channels with explanations and recommendations, which are sifted and screened for presentation to top management at a monthly meeting of the management committee. These meetings provide a clear view of the favorable and unfavorable factors that are influencing revenue and expense from month to month, and they call for a specific rather than general explanation of the variances that develop between actual expenses and budget allowances, Purdy said.

The office services department of the company under G. D. Leckie includes a general section for controlling office furniture and equipment, maintaining records, pooling machines and microfilming, a stenographic pool to be drawn on by different departments, a stationery section, which revises and reissues all forms, a mailing and duplicating section and a tabulating section. This last handles 44 operations for 22 different departments, and creates more than a million cards per month. It is under the supervision of E. S. Gardiner.

The methods by which month-end and year-end closing figures are produced more promptly were explained by M. H. Fox, costing supervisor. It is largely a matter of establishing a rigid schedule of the day and hour when certain types of information are to be received by each section or department and the coordination of this schedule with the over-all reports to be produced, he explained.

The process by which administrative, engineering and supervision expense is allocated to the different divisions and services of the company and to plant was explained by L. E. Beard, general accounting supervisor. The Public Utilities Commission of B. C. worked in conjunction with the company on the study that developed the allocations in use. The allocations are an important part of the budgetary control system of the company.

Clause Groth, Pacific Power & Light Co., explained the use of clearing accounts in his company in lieu of direct allocations. Once a year administrative and general expense are cleared to electric, water and steam divisions on the basis of investment and operating expense for the purpose of reporting to the Public Utility Commission.

Another innovation at this year's meeting was a separate session conducted for the customers' accounting group with F. A. Adams, assistant customers' accounts manager, B. C. Electric Co., as chairman. In this session, V. D. Jones, customers' accounts manager, described the station system in which about 20,000 accounts are allotted to each station. The station clerks have charge of all the bookkeeping and recording work for the group of accounts in their care. Their duties include the answering of all telephone inquiries, complaints, and requests for information in respect to these accounts.

E. S. Gardiner, in charge of the billing department, explained the successive machining operations in the billing process, including proof of extensions, setting up of cycle balance controls, cutting revenue summary cards by rates for statistical purposes, producing advanced cards in preparation of the month's billing and the screening of accounts for high-low check.

The discussion on credits and collections led by L. D. Thom, acting credit manager, indicated that although there had been no noticeable increase in write-off for bad debts, the number of service disconnections for nonpayment were mounting. The value of field collectors as opposed to other practices involving letters, notices, telephone calls and shut-offs was discussed without reaching conclusions as to the relative merits of these practices.

The meeting was addressed by Dr. W. A. Carrothers, chairman of the Public Utilities Commission of British Columbia, on the basis of regulation in that province. Regulation must always be based on the public interest, he said, but the public interest includes not only matters of rates and service but a responsibility to the utility to see that it gets enough revenue so that it can attract capital for improvement and growth in plant to give adequate service to the area it serves. The well being of the utility's employees is also a factor in the public interest, and the B. C. Commission attempts to take all these factors into consideration in its regulatory deliberations, Dr. Carrothers said.

E. W. Bredemeier, manager of the customers' service division, Portland General Electric Co., was named vice-chairman of the section.

Quick Catch-up

IES

Home lighting activity and new developments in that field will be given special attention at two half-day sessions of the National Technical Conference of the Illuminating Engineering Society to be held during the week of Sept. 19 at the French Lick Springs Hotel in French Lick, Ind.

Mother Lode Chapter of IES, whose boundaries now include an area within a 50-mile radius of Sacramento, has been extended to cover Reno and that territory to the Oregon line. With this extension Walter Herz of Sierra Pacific Power, chapter representative in Reno, will assume more responsibility in acting as membership chairman for the new Nevada counties included. This action also opens the possibility for an eventual chapter in Reno.

Don Prideaux, General Electric Lamp Department, regional chairman of IES, will be chairman of the National IES Convention to be held in Los Angeles during 1950. Prideaux was introduced at a meeting of the IES, with the EMEA of Southern California as its guests.

Bureaus

Northern California Electrical Bureau is offering the Bob Bale course in personal development, scheduled in a series of three sessions, each running for three nights.

Sales training committee of the Bureau of Radio & Electrical Appliances of San Diego County is making plans for resuming its popular sales and educational programs for this fall. Questionnaires to all members are being sent out outlining the available courses and programs. As before the bureau will work with the vocational school for these classes.

Association of Appliance Dealers

Radio and television problems were discussed at the Aug. 10 luncheon meeting of the Association of Appliance Dealers in Seattle. The group considered means of supporting the Television Broadcasters Assn. request for another TV channel for Seattle and what the group can do to make radio and TV more profitable . . . Board of directors meeting the following day dealt with plans for fall activities and a trade directory for the industry in that area . . . Its regular monthly breakfast meeting on Aug. 16 was devoted to a discussion of trade-ins.

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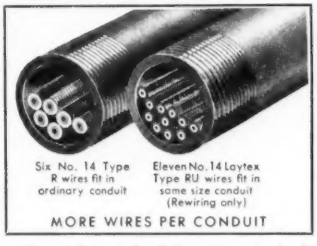
Laytex permits more wires per conduit because it is America's smallest diameter, lightest weight, natural rubber covered branch circuit wire. U. S. Rubber Company's unique dip method applies 90% pure rubber to the conductors, eliminating the usual bulkiness and weight. Electricians on rewiring jobs will tell you that they can put eleven No. 14 Laytex Type RU wires into a conduit that holds only six No. 14 Type R wires. Moreover, they can use the same conduit—no need to rip it out.

Laytex RU is easier to pull through the conduit, because of a special wax finish. In a laboratory test, only 22 to 26 pounds pull was needed to draw Laytex through the conduit—as compared with 32, 30, 42, 45, and 80 pounds, respectively, for 5 other leading brands. That means Laytex is 33% to 300% easier to pull.


Six No. 14 Type R wires fit in ordinary conduit
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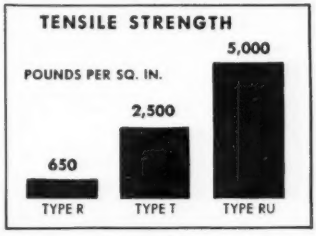

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IAEI

O. T. Fugitt of the Portland electrical inspectors department now heads the Oregon Chapter of the International Association of Electrical Inspectors, as its chairman, with James Vernon, Oregon state inspector, as vice-chairman; Paul L. Miller, secretary-treasurer; and Mike Glenn and Jack Krauser, executive committee members.

Sacramento Valley Chapter of IAEI held a regular evening meeting on Aug. 10.

Code discussion and inspectors' problems are on the agenda for the next regular quarterly meeting of the Puget Sound Chapter, IAEI, on Sept. 10.

A full program of speakers and movies highlighted the third quarterly meeting of the Central California Chapter of the Southwestern Section, IAEI, at Fresno on Aug. 13. Following a picture on the construction of wire and cable, presented by Frank Dickey of Anaconda Wire & Cable Co., Jack Doorschodt of Thomas & Betts Co. spoke to chapter members. Charles Luce of General Electric discussed motor controls for industrial and pumping plant applications. Pacific Gas and Electric Co. presented its picture *Snow*, taken while maintaining the transmission lines in the high Sierras during the past winter. A buffet lunch at Incandescent Supply Co. followed the morning meeting.

Plans are being readied for the annual meetings of both Northwestern Section (Butte, Oct. 3-5) and Southwestern Section (San Diego, Oct. 10-12), International Association of Electrical Inspectors. Among others, addresses by G. E. Manning, superintendent of label service, Underwriters' Laboratories, Chicago; H. H. Watson, General Electric Co.; Paul Heffelfinger, Chase-Shawmut Co.; J. J. Siddall, H. H. Robertson Co., will be heard.

Utah Chapter, IAEI, named A. E. Fleming, General Electric Supply Corp., secretary-treasurer, to succeed A. L. Mitchell, resigned, at its last meeting.

Southern California Chapter, IAEI, reported agreement on adoption of standard customer-owned temporary service poles for the area. General discussion of inspector problems characterized the Los Angeles meeting, presided over by George Tansey, chairman.

Northern California Chapter, IAEI, continued discussion on hospital wiring conflict of rules by various agencies. James Ambrosi was appointed to get a panel of doctors and representatives of state agencies to discuss the issue at the next meeting in San Rafael, Sept. 17. Howard Dodge, Underwriters' Laboratories, cited many instances of misuse of devices listed for other applications.

Contractors

Controversial and still unsettled, the vacation with pay demand of IBEW-B595, Alameda County, and of its neighbor local in Contra Costa County, Calif., went to the Council on Industrial Relations for the Electrical Contracting Industry meeting in Chicago, late in August. Decision had not been made public at press time.

Case of the San Jose electrical contractors, opposing a scale raise from $2.40 to $2.50 per hour was presented at the same meeting. No report as to its outcome.

National Electrical Contractors Assn. is studying the possibility of making correspondence courses on contracting business administration, accounting and estimating, Edgar Altholz, International Text Book Co., held meetings to sound out the demand.

Tommy Heinz, governor, San Diego Chapter NECA, has sold his business and has resigned. Al Eddy, Eis-Hokin & Galvan branch manager, president of the chapter, takes on the governor office as well. The chapter staged a big social meeting Aug. 19 at La Jolla Country Club.

San Francisco Electrical Contractors Assn. voted changes in its bylaws to collect its dues on percentage of labor pay roll. Dues will now include a member's NECA dues. Its manager, W. J. Varley, presided at a mass joint apprentice graduation for the entire building trades last month.

Rocky Mountain Chapter, NECA, now has a branch in Pueblo, that city's contractor group joining the chapter as a group. The chapter plans a past-pay expense deal for its members to attend the NECA national convention at Houston, Tex., Nov. 8-10. Copies of *Electrical Construction & Maintenance* magazine, containing *Electrical Specifications* feature section, have been distributed to architects and will be used in educational meetings of the chapter, according to Don Larson, manager.

Electrical Contractors Society of Washington (an independent group) holds its third annual convention at Hotel Cascadian, Wenatchee, Sept. 16-18. Speakers include William Ritt, secretary, Midwest Electrical Council; A. R. Wooley, president, Idaho State Electrical Contractors Assn.; K. V. Allison, president, Pacific Electrical Contractors Assn. and others. D. L. Black is society president; T. Ralph Neilson, manager.

John R. Fisher was appointed field representative for District 8, the states of Colorado, Idaho, Montana, Utah and Wyoming. He makes his office at 302 Boston Bldg., Denver, the Rocky Mountain Chapter headquarters.

Robert Higgins has been assigned to the staff of E. R. Cornish, director, Pacific Coast office of NECA, 1355 Market, San Francisco, as his assistant. Higgins is a recent electrical engineering graduate and GI.

NARC

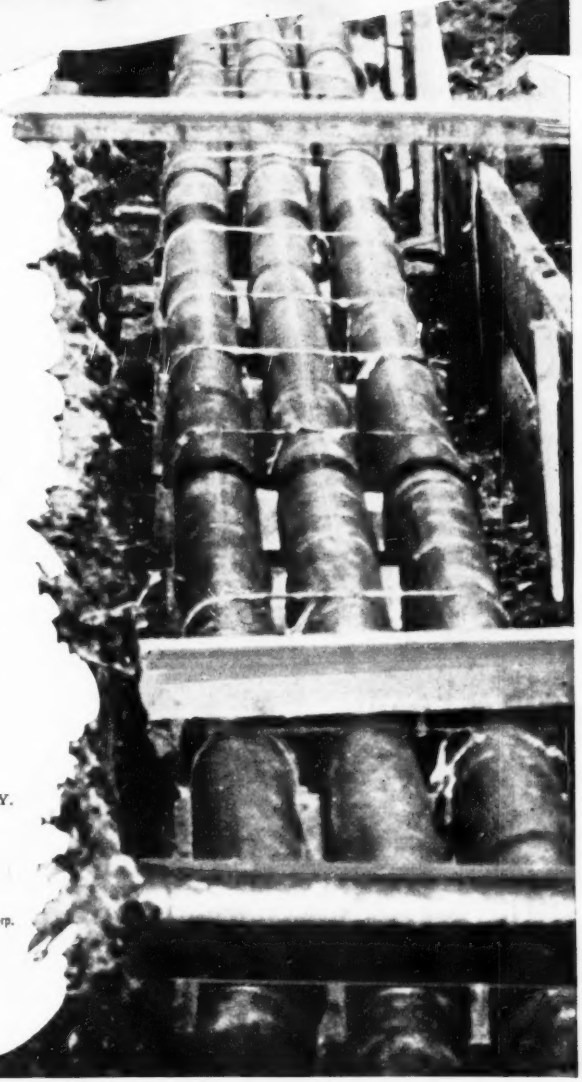
National Association of Refrigeration Contractors has changed its name to Refrigeration & Air Conditioning Contractors Assn. . . . The association at its regular quarterly meeting approved a joint resolution with the United Association of Journeymen and Apprentices of the Plumbing and Pipe Fitting Industry of the United States and Canada, AFL, which states that the United Association has sole jurisdiction in the refrigeration and air conditioning industry; that the NARC is the national association representing the refrigeration and air conditioning industry; that its local chapters are the bona fide bargaining agents for labor agreements, and that the two organizations agree to undertake mutually an apprentice training program for the refrigeration industry.

Pot and Kettle Clubs

San Francisco Pot and Kettle Club's new officers will be inducted at the club's first meeting in September. President of the group is E. B. Happoldt Jr., Charles G. Putnam Co.; first vice-president, Geo. L. Hall, manufacturer's representative; second vice-president, Walter Stone, William P. Horn Co.; treasurer, George Douma, Western manager of National Enameling & Stamping Co.; corresponding secretary, W. G. Macdonald, L. E. Fiske Co.; recording secretary, James Anderson, Vinton Co.

Fred C. Wood of the Fred C. Wood Co., San Francisco, was elected president of the Associated Pot and Kettle Clubs of America at the closing business session of the group in Santa Barbara recently. He succeeds Lester L. Neblett. Other officers elected are: Clark Wright, Meier & Frank Co., Portland, vice-president; Dave Bartelme, Bart-Kinnison Co., San Francisco,

A Report from The Underground...



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treasurer; Walter Stone, William P. Horn Co., San Francisco, secretary. Board of director members include: Ben Brice, Spokane; Louis McAllister, Los Angeles; F. J. Bennett, Denver; Ben T. Clark, Salt Lake City; Robert Morrison Jr., Portland; R. W. Tull, San Francisco.

Shortly after assuming office President Wood announced the following appointments of regional vice-presidents: Stan Clark, Seattle; George Douma, San Francisco; Al Sager, Los Angeles; Robert Chaffer, Portland; Al Solen, Denver; John Armenia, Spokane; William F. Fredrickson, Salt Lake. Milton Albin, associate editor of *Hardware World*, San Francisco, was named publicity director.

IEEDA

Stevens County Chapter, covering Colville, Chewelah and other communities in Stevens County, Wash., has been added to the Inland Empire Electrical Dealers Assn. Heading the new group is Vern Barney of Colville; with John Kinkaid of Chewelah as vice-president; R. T. Paine of Colville, secretary-treasurer; and J. W. Bouska of Chewelah, governor-at-large.

RMEL

Rocky Mountain Electrical League's 46th annual convention being held Sept. 11-14 at Estes Park, Colo., will be reported in the October issue.

Leagues

Plans are under way for construction of a permanent electrical display building at Vancouver's Exhibition Park. The proposal is being developed by the B. C. Electrical Service League with the directors of the Pacific National Exhibition. The plan had been suggested prior to the war, and is now being revived. W. C. Mainwaring and C. A. Morrison have been appointed as an investigating committee.

The Electrical Service League is also working towards securing the establishment of a laboratory to the University of British Columbia to test various electrical devices. It is contended that such a laboratory would eliminate the necessity of long delays now experienced in submitting equipment for tests by the Canadian Standards Association at Ottawa.

IUHA

The engineering committee of the Industrial Unit Heater Assn. is carrying on a series of laboratory tests in preparation of a uniform code for sound measurement of unit heaters. Code is expected to be published by the end of this year.

PANORAMA OF THE PCEA

Edited by A. X. Schilling

Fall Conference at Fresno

Thursday and Friday, Nov. 17 and 18—those are the dates scheduled for this year's annual fall conference in Fresno. Meetings will be conducted in the Hotel Californian, Hotel Fresno and in some meeting rooms in the PG and E building. The three guidance committees met on Aug. 31 to shape up their plans for the approval of the board of directors, which met the following day. The newly formed right-of-way and land discussion group will be inaugurated at the conference, with H. L. Moore as sponsor.

Committees Appointed

Here are the members of the committees for the current year: Administrative Services guidance committee—L. W. Brillhart, chairman; E. J. Wright, vice-chairman; H. L. Moore, Charles Grunsky, J. F. Brennan, P. C. Hale, W. F. Ruth, C. W. Hughett, Cranston Springer, R. G. Kenyon, R. E. Johnson, Dexter Stoner, J. M. Mayfield and K. C. Christensen.

Members of the Business Development guidance committee are: G. N. Hawley, chairman; R. I. Mendes, vice-chairman; F. M. Raymond, T. W. Christensen, Lyle B. Jones, J. S. Walsh, H. C. Rice, J. S. C. Ross, L. Wollenberger, J. A. Corlett, C. L. Moore, S. W. Scott, E. R. Gray and C. D. Smith.

Operating Economics guidance committee members are: F. D. Beardsley, chairman; A. A. Straub, vice-chairman; E. C. Hunt, C. C. Blecksmith, P. H. Adams, Alf Hansen, H. N. Skow, G. C. Crawford, Marshall Lasher, C. W. Schweers, George H. Groh, H. J. Schomberg, W. H. Brown, Dean P. Cady, Charles Morris, D. R. Ritchie and W. E. Nagel.

H. F. Hartzell has been named chairman of the highway lighting committee, with the following members: O. R. Doerr, R. C. McFadden and H. G. Dillin. The technical subcommittee is composed of G. M. Rankin, chairman; J. E. Hammond, H. F. Kipp, K. M. Koch, L. W. Lulcy, L. W. Towner, G. A. Trosper, F. J. Wellhouse, W. E. Vaughn Jr. and G. S. Kimball.

The adequate wiring committee will be chairmanned by J. H. Adams, assisted by Elbert Kramer, E. H. Galchutt, K. G. Kempf, E. M. Frellson, R. M. McPherrin, A. M. McMillan, G. F. Wismer, A. C. Miller, C. V. Soper, William McKinley, D. F. Flynn II, R. J. Walker, C. H. Thrane, Harry VanCott and E. W. Bray.

The advertising committee will be composed of the following: F. M. Raymond, chairman; Charles Palmer, J. A. Corlett, Lester Healey, R. R. Gros, Don Willis, R. L. Dunshee, J. T. Fearnehough, H. W. Hayes, R. L. Hayden, H. S. Schuler and W. A. Cyr.

Members of the Agricultural Power Handbook committee are: T. W. Christensen, chairman; H. R. Haines, J. H. Rae and B. D. Moses.

The liquified petroleum gas committee members are: Lyle B. Jones, chairman; Frank Ballman, W. F. Lambirth, Wayne Matthews, Howard Oliphant, C. V. Soper and W. C. Hopkins.

Commercial and industrial lighting committee members are: J. S. Walsh, chairman; A. I. Benedict, T. A. Esling, W. E. Carlson, C. O. Martin, E. O. Anders, Guy deLeuze, L. A. Hobbs, R. W. Thunen, C. R. Long, D. G. Parker and H. C. Barnard.

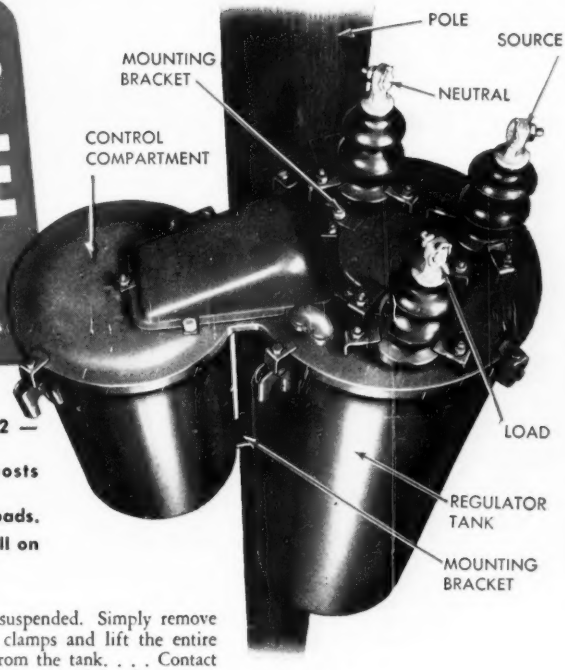
Communications committee members are: P. H. Adams, chairman; G. E. Bishop, L. W. Lengnick, N. L. Clarine, R. H. Miller, T. A. Phillips and J. K. Reaves.

Safety committee members are: E. C. Hunt, chairman; F. L. Preizner, N. C. Smith, William Osborne, G. E. Bishop, J. E. Smith, W. E. Brown, C. A. Fischback, H. V. Chambers, R. W. White.

These committees are in the process of being completed: meter, C. C. Blecksmith, chairman; home economics, Mrs. Marjorie Harper, chairman; home lighting, J. W. Howard, chairman; kitchen and laundry, K. L. Hampton, chairman; television, J. Clark Chamberlain, chairman; resolutions, George C. Tenney, chairman; nominating, M. G. Sues, chairman; budget and finance, R. N. Dreiman, chairman; publicity, R. W. Jackson, chairman; membership, E. H. Galchutt, chairman, and H. A. Lee, vice-chairman; code and ordinance, K. M. Ryals, chairman, and G. F. Maughmer, vice-chairman.

Regulate Rural Voltage ..Don't Just Boost It!

NEW
ALLIS-CHALMERS 5/8% STEP
Pole-Type VOLTAGE REGULATOR



- ✓ **Provides full 20% range of regulation in 32 — ⅝% steps (10% raise and lower)**
- ✓ **Increases line and system capacity — boosts revenue.**
- ✓ **Satisfies customers — helps build additional loads.**
- ✓ **Costs but a few dollars per customer to install on average line.**

PROPER VOLTAGE REGULATION is more than just boosting voltage. It means providing adequate voltage during peak load — adjusting for light load. It means close control — and a wide range of regulation.

Here for the first time is city type ⅝% step voltage regulation from a small, low cost, pole mounted regulator.

Allis-Chalmers new pole type voltage regulator is fully automatic . . . regulates line voltage through a range of 20% in 32 small ⅝% steps, and holds ± 1 volt band. Rating is 10.8 kva, 15 amp, 7200 v, ± 10% regulation.

Easy maintenance — easy mounting — simple control are provided. First, it is cover-suspended. Simply remove four cover clamps and lift the entire regulator from the tank. . . . Contact life is long. . . . Quick-break mechanism eliminates arcing and pitting. In addition, because of small ⅝% steps, contacts interrupt smaller kva — last longer. Unit is mounted on pole as easily as distribution transformer. . . . Control requires just two simple knob adjustments to set.

Ask an Allis-Chalmers field engineer to determine the best means of improving voltage conditions on your rural system using voltage regulators. Contact a nearby A-C Sales Office or send in the coupon.

A-2779

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Could YOUR present system economically handle new loads such as this?

Perhaps you would find it difficult. In the past years, many factors have prevented you from realizing a "perfect system".

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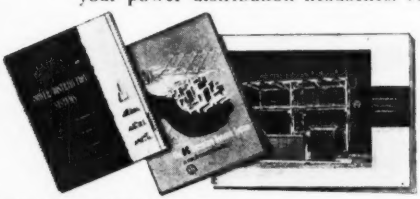
System planning will eliminate many of your power distribution headaches. Make every replacement or extension a part of this planning. Then, as old equipment is replaced, your *planned system* will economically "pay off".

How can Westinghouse help?

Our engineers have worked with all types and sizes of utilities throughout the country. They have helped solve power distribution problems of all kinds. This nationwide experience will enable them to assist you in your planning. Call your nearest Westinghouse office, or write Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania. J-97139



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One of the many ways in which Westinghouse feels it can help you in your problem is to crystallize and formulate the best thinking on "System Planning" that has been done in this field to date.

"Electric Utility Power Distribution Systems", B-3905—made possible by *your* co-operation, explains and classifies typical systems for *all* types of areas.

"Co-ordinated Substation", B-4061—presents a complete standardized line of substation designed and manufactured to answer any *system* requirement.

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ASK FOR A PRESENTATION OF THIS VALUABLE INFORMATION

Westinghouse

SYSTEM PLANNING SERVICE

THE MONTH IN BRIEF

Service Extension Ban Discussed

A proposal to ban extension of electric service to new large-scale customers "until expiration of the present emergency" has been taken under advisement by the Washington Public Service Commission. The resolution is the same as one adopted recently by the Pacific Northwest Utilities Conference Committee, and was presented to the commission by C. A. Erdahl, Tacoma utilities commissioner and chairman of the conference committee. It recommended that there be no connections made for new or additional electric space heating installations and that there be no connections of industrial loads of 500 kw. or above. A Heating Manufacturers' Assn. representative challenged the authority of the commission and spokesmen for the manufacturers said special equipment could be attached to the space-heating devices to reduce power load.

Construction Over Public Lands Disputed

Charging wilful trespass, the Department of Interior last month asked the federal court in Boise to enjoin Idaho Power Co. from building a power line over public lands. Dismissal of the complaint was requested by the company, which was forced to stop work on the 138-kv. Boise-American Falls line. T. E. Roach, company president, said the government suit does not involve obtainment of right-of-way, now pending before FPC, but is a question of advance permission to construct across public domain. Declaring the line essential for adequate service next winter, he accused Interior of "trying to force the company, as the price for advance construction, to agree to transmit government power under terms of the department's recent regulations." Declaring that the action is unprecedented in 33 years the company has used right-of-way across the desert, Roach pointed out that, since 65% of Idaho is government owned, the new regulations would apply to virtually every transmission line to be built in the future.

Western Utility Construction Down Only 2%

Electric utilities of the West will actually spend this year 98% of the $450,000,000 originally budgeted for new facilities for 1949. This is revealed in an interim report on the status of utility construction programs just completed by ELECTRICAL WEST. The fact that there has been practically no cut in construction programs up to the first of September of this year conforms to the upward pattern of Western business. It is indicative of the confidence utility management, both private and public, have in the continued population and industrial growth of the West.

This confidence is borne out by proposed 1950 budget estimates. Figures just compiled from return from 90% of all utilities show that total expenditures for 1950 will be $400,000,000 as against the $441,000,000 to be spent this year. Reports from federal agencies, not included in these figures, indicate that 1950 electric power expenditures will be as great, and with one agency, even greater, than the amounts spent during 1949.

This means that 1950 electric power construction will be only 10% below the record-breaking year of 1949. This 10%, or $44,000,000 reduction in 1950 expenditures by other than federal agencies, is more than all accounted for by the completion of a number of major generating plants this year, for which money appeared in 1948 and 1949 budgets. Actually, therefore, expenditures during 1950 for transmission, major substations and especially distribution, will be even greater than they were for this present record year.

Rate Increase Request Turned Down

Utah Power & Light Co. application for a rate increase was denied following hearing by the state public utilities commission. The company requested the increase last March to attract sufficient capital for completion of its $61,000,000 construction program. Witnesses for the company testified that construction capital would cost at least 6.25%. Also rejected by the commission was a petition by organizations including the Utah Consumers Welfare League and the state CIO that company rates be reduced to bring income down to 5.5%. In its ruling, the commission stated that testimony indicated a return to UP&L of 6% during 1948, which it held "fair and reasonable."

Pacific Coast AIEE Meets

Engineers were called upon to help restore and preserve the sanity of mankind and the principles without which our civilizatin will certainly disappear, in an opening address by W. C. Mullendore, president of the Southern California Edison Co., before the Pacific Coast meeting of the American Institute of Electrical Engineers, held in San Francisco Aug. 23-26. "The engineer must be more than an engineer in the world of today because the world needs his trained mind and analytical ability in the field of human relations, said Mullendore. With a registration of 827 the meeting set a record or near record for institute meetings on the West Coast.

Moves to bring about a better understanding among engineering groups were discussed by James F. Fairman, institute president. Engineers can be persuaded to pull together if the right formula is found and the right leadership provided, declared Fairman. A total of 65 technical papers and an imposing array of inspection trips provided interest and diversion for all. A complete report of the technical sessions will appear in the next issue of ELECTRICAL WEST.

Transmission Line Funds Okayed

By a voice vote the Senate on Aug. 25 adopted an amendment to the committee-recommended Interior Department appropriation bill increasing Central Valley project funds by $2,100,000. Of this amount, $2,000,000 was for initial construction of the controversial west side transmission lines and $100,000 was for additional surveys. The committee had not approved either of these items. The appropriation bill, which totaled $663,000,000, also included transmission lines in the Northwest, Southwest and Rocky Mountain areas.

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Four Cutouts in one!

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These General Electric enclosed fuse cutouts simplify your stocks. With ***three interchangeable doors***, which fit both 5-kv and 7.5-kv housings, you get four operating functions—indicating, drop-out, two-element reclosing, and disconnect.

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When you need visual indication of a blown fuse, these are the cutouts to use. They are liberally designed—have permanently high dielectric strength, provide full-range interruption of fault currents and are conservatively rated as to interrupting capacity. All live parts are completely enclosed for maximum safety. For complete information, see your nearest G-E Representative, or write for Bulletin GEA-3448. ***Apparatus Department, General Electric Company, Schenectady 5, N. Y.***

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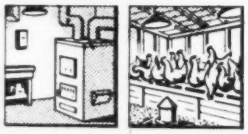

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THIS MONTH'S NEWS

Ross Dam Formally Accepted by Seattle

The $28,000,000 Ross Dam on the Skagit River hydroelectric project was formally accepted by the Seattle Municipal Board of Public Works on Aug. 18. Construction was started 12 years ago.

The 540-ft. high structure will impound a maximum of 1,400,000 acre ft. of water. For the present it will be used only as a storage dam to serve generators at the downstream power houses of Gorge and Diablo dams which in an average year will produce about 500,000,000 kwh. at an approximate value of $5,000,000.

Bids are expected to be called early next year for construction of a new power house at Ross to house three 90,000-kw. generators now on order from Westinghouse. Installation of the first generator is scheduled for 1952 and the other two will go on the line in 1953. Installation of a fourth generator is proposed for 1956.

The dam, which is named after the late J. D. Ross, long-time superintendent of Seattle City Light, was accepted by W. C. Morse, superintendent of the Board of Public Works, and E. R. Hoffman, City Light superintendent, from Thomas Orme, project manager for the General-Shea-Morrison Co., contractors.

Hoffman praised the contractor's safety record, marred only by four deaths during construction. "Only a few years ago," he said, "a safety record was considered good if deaths on a large project did not exceed one for every $750,000 of construction value. On Ross Dam, deaths were held to one for each $7,000,000."

Other construction on the Skagit project is still in progress. The Gorge power house is being enlarged to permit installation of an additional 60,000-kw. generator next year, while a low concrete diversion dam is being constructed below the intake to the 11,000-ft. tunnel that carries water to the Gorge power house. This new low dam will be replaced with a high dam in 1956. This will increase the Skagit's hydroelectric capacity to 644,000 kw.

● SOUTHERN California Edison has ordered four 220,000-volt transformers from Westinghouse for installation at Big Creek No. 4 hydro generating station near Fresno. Cost will be slightly less than one-half million dollars.

I'm built to take it ...and DELIVER!

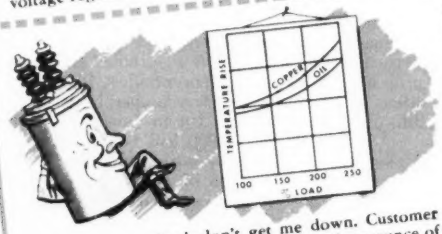
RAIN OR SHINE... it makes no difference! Load me or *overload* me, I'm built to take it ... from the top of my bushings right down to the bottom of my cold-rolled, oriented silicon steel core. Moloney engineers considered everything that could possibly happen to a line transformer and went to work to design a transformer to do the job better. I'm the answer ... literally a test-tube baby ... *lighter, smaller, better* ... with a "Surge-Tested" Design pedigree!

MEAN 19

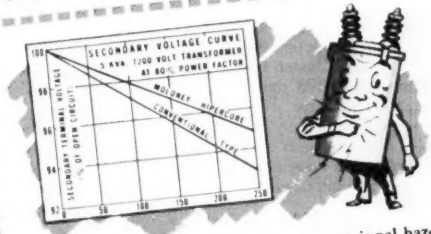
Here's WHY

The cold-rolled, oriented silicon steel used in my core has 30% to 35% greater flux carrying capacity than non-oriented steel. In 3 Kva size I weigh but 125 lbs. including oil, and with CSP attachments only 140 lbs. Yet with less weight I have greater short-time overload capacity and provide better voltage regulation.

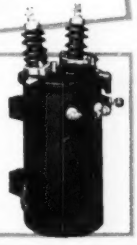
Because my cores are smaller, so is my coil. This reflects not only in my weight, but in my size. Ordinary transformers of the same Kva up to 30% larger find difficulty in performing tasks I consider routine. Besides, I don't need nearly as much space in the storeroom, on the line truck, or on the pole.



Short-time *overloads* don't get me down. Customer loads, being what they are, anyone with an ounce of temperature gradient knows that heavy peak overloads are inevitable. So I just keep calm and am thankful for my generously proportioned cooling ducts and maintain a lower hottest-spot-over-oil temperature.



My engineers say that some of my occupational hazards send many young transformers to an early grave. They tell me not to worry though, because my rugged constitution can take these hazards in stride and that I will live a lot longer on the job than many of my contemporaries ... and perform better!



Illustrated: 5 Kva, 7200 to 120/240 volts Conventional Type HiperCore Transformer.

Send for Bulletin H-303 for complete details of HiperCore Transformers.

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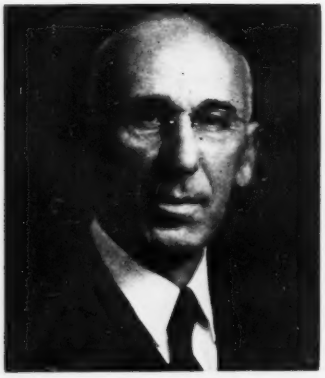

Dedication ceremonies on Oct. 22 will change the name of the Mechanic Arts Bldg. at the State College of Washington, Pullman, to the H. V. Carpenter Hall, honoring the long-time dean of the college of engineering. From 1917 until his death in 1941, Hubert Vinton Carpenter was dean of the College of Mechanic Arts and Engineering at WSC, with office in the building to which his name will be given. His service to the college began, however, in 1901 when he started as assistant professor of physics and electrical engineering. For many years Dean Carpenter was an advocate of the Coulee Dam project and in 1935 he was made a consultant for the National Resources Commission on the Columbia River Regional Control Plan. He was a member of the American Institute of Electrical Engineers, the American Society of Mechanical Engineers and the American Society for Engineering Education

Tacoma Preparing New Data on Cowlitz Dams

Until new facts can be presented, the Interior Department must support its Fish & Wildlife Service in opposing construction of two hydroelectric dams on the Cowlitz River in southwest Washington state by the city of Tacoma, Assistant Secretary C. Girard Davidson said in Seattle recently. However, data are being prepared which Tacoma city authorities believe will show that the proposed dams would not interfere with movement of salmon up the river to spawn.

Tacoma has an application pending before the Federal Power Commission for permission to build the dams. The recent state legislature set aside the stream as a fish sanctuary but Tacoma believes a federal grant in its favor would overrule the state action, as the application was made before the state legislature acted.

The two dams, at Mayfield and Mossyrock, would cost an estimated $135,000,000.

Contract Provides For McNary Dam Construction

McNary Dam Contractors, a combination of the Guy F. Atkinson Co., Ostrander Construction Co. and J. A. Jones Construction Co., has been given notice to proceed with construction work on the Oregon shore at McNary Dam on the Columbia River under terms of a $15,835,539 contract.

The contract calls for construction of a "junior" cofferdam to enclose an area for a portion of the power house excavation, the concrete substructure for two main power units, station service unit and assembly bay for the power house, a portion of the Oregon shore abutment and a "second-step" cofferdam which will provide for the final power house and spillway work.

Completion is specified by May 1, 1951, according to Col. William Whipple, Walla Walla, Wash., district engineer, Corps of Engineers.

FPC Gives Licenses to Irrigation Districts

FPC has granted a 50-year license to Oakdale and South San Joaquin Irrigation districts for construction and operation of a hydro project on the middle fork of the Stanislaus River in Tuolumne County, Calif. Estimated cost is $8,840,000.

The development will consist of a rock-fill dam with a maximum height of 275 ft. and a crest length of 1,150 ft. including spillway; a water conduit; power house and switchyard immediately below the dam. At maximum storage level, the reservoir will have a surface area of 720 acres and gross capacity of 97,500 acre ft. A 13,500-hp generating unit will be installed in the power house.

● FRANCHISE for a power distribution system to cost about $1,000,000 was granted to the Death Valley Electrical Cooperative Inc. by the San Bernardino County Board of Supervisors. The cooperative plans to build some 300 miles of lines in southeastern Inyo County, the northeast corner of San Bernardino County and portions of western Nevada.

Pine Flat Dam Bids Will Be Opened at Sacramento

Bids for construction of Pine Flat Dam will be opened in Sacramento, Calif., on Nov. 1, Col. Joseph S. Gorlinski, Sacramento district engineer, Corps of Engineers, announced in mid-August.

Work on the $51,000,000 dam on the Kings River near Fresno will include construction of the main dam and appurtenant structures. Construction of penstocks for future power development is included in the contract.

No appropriation for construction of the dam proper has yet been approved. Up to June 30 of this year $6,700,000 had been allotted for preliminary work, which has included excavation of abutments and relocation of highways and power lines.

● CALIFORNIA OREGON POWER CO. is offering an issue of 250,000 shares of common stock at $23.25, President A. S. Cummins has reported. Proceeds of the sale, with those from sale of $7,000,000 first mortgage bonds, will be used to refund bank indebtedness and to finance in part the company's construction program. The stock sale is being handled by Blythe & Co.; First Boston Corp.; Dean Witter & Co.; Merrill Lynch, Pierce, Fenner & Beane; Smith, Barbey & Co., and Kidder, Peabody & Co.

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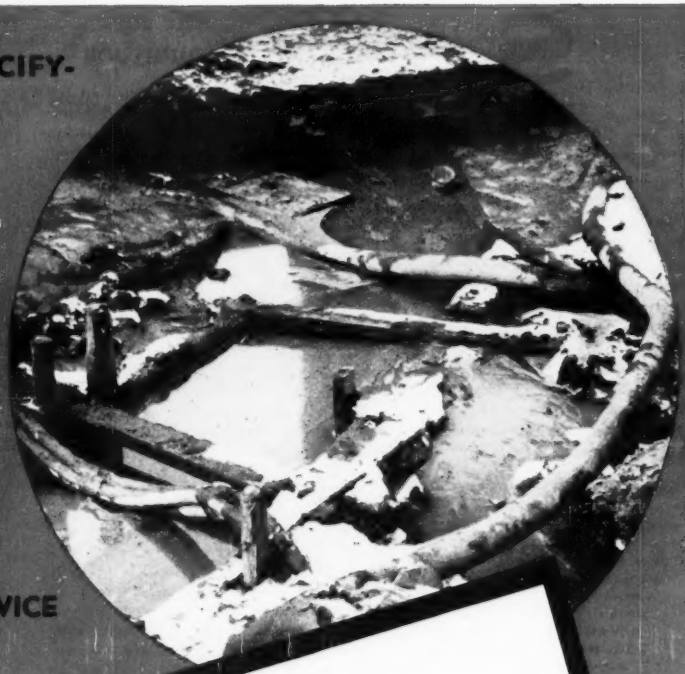

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B. C. ELECTRIC WILL BUY POWER FROM COMMISSION

Details have now been released for purchase of power by B. C. Electric Co. from the B. C. Power Commission to supplement its supplies in the lower Vancouver Island area. Premier Byron Johnson stated the B. C. Electric company will pay $2.23 1/3 per kilowatt per month and will take a minimum of 17,500 kilowatts a month under terms of the agreement which goes into effect Oct. 1, 1950. The contract is for 25 years, with an option for a 15-year renewal.

The Premier pointed out that by this arrangement the company will pay at least $465,000 a year to the power commission, and more if it requires power above the minimum figure. The commission has agreed to supply up to a maximum of 42,500 kw. per month.

The company is now engaged in building a high-voltage transmission line from Victoria to Nanaimo at a cost of $2,000,000 to tap the publicly owned system there. Power supply on Vancouver Island is divided between the publicly owned commission and the private utility. The power commission supplies Cowichan district and all points north of there with the John Hart development as its major source of power.

B. C. Electric handles the distribution on the lower end of the island, south of Cowichan, with the Jordan River and Goldstream hydros, and the Brentwood steam plant producing the power.

Northwest Companies Agree To Take B. C. Power

Five Washington and Oregon power companies have agreed to purchase up to 30,000 kw. of power daily from British Columbia Electric Co.

Power agreement, which provides for purchase of a minimum of 70% of the maximum to be supplied, involves Pacific Power and Light, Portland General Electric, Washington Water Power, Puget Sound Power and Light and Mountain States Power companies.

Transmission lines of Bonneville Power Administration and Seattle City Light will be used, with power coming from British Columbia over the Arlington, Wash., interconnection.

United States cities benefiting from augmented power supplies will include Portland and Albany, Ore., and Seattle and Spokane, Wash.

The power was made available by the recent completion of additional generating facilities at BCE's Bridge River hydro plant. A second 62,000-hp. unit was put into operation this spring; a third will go into production this fall.

Purchase contract runs to Sept. 30, 1951.

Hearings Scheduled for Alco B. C. Development

Public hearings will be arranged to permit objections to be voiced against plans of the Aluminum Co. of Canada for hydroelectric and aluminum plant development in British Columbia. These hearings will be held the end of September.

Major R. C. Farrow, comptroller of water rights, announced this after the Aluminum company filed formal application for water rights on the Nechako and Chilco river systems, the two possible sources of water power for the $500 million development scheme.

Fisheries interests who claim the Chilco hydro would seriously affect Fraser River salmon runs will have the opportunity to submit their views to the comptroller.

Also affected are 50 to 60 farmers in the Nechako area, whose farms would be flooded out by the impounding of waters in the Ootsa and Eutsuk Lake country. Under terms of the water right applications filed by the company, people with objections have until Sept. 9 for notice of intentions.

● Low Water at Grand Coulee Dam has enabled the Pacific Bridge Co. of San Francisco to resume work on its $1,804,000 contract for spillway repairs and downstream dredging. Four drumgates have been closed to make work possible on eroded section of the spillway bucket, using a casisson barge. Damage to the west power house draft tube ramp extension by the 1948 Columbia River flood will be repaired under a $21,000 contract awarded by the Bureau of Reclamation to the Morrision-Knudsen Co. Inc. Peter Kiewit Sons Co.

● Pacific Gas and Electric is making exploratory tests to determine feasibility of expanding Lake Almanor from 22,000 to 28,000 acres to bring it to its maximum storage capacity of 1,300,000 acre ft. The reservoir has been operated at about half its designed capacity to serve two Feather River hydroelectric plants, Caribou and Big Bend. Enlarged capacity would assure water for two new plants nearing completion, Cresta and Rock Creek, as well as providing an added supply of irrigation water for the Sacramento Valley.

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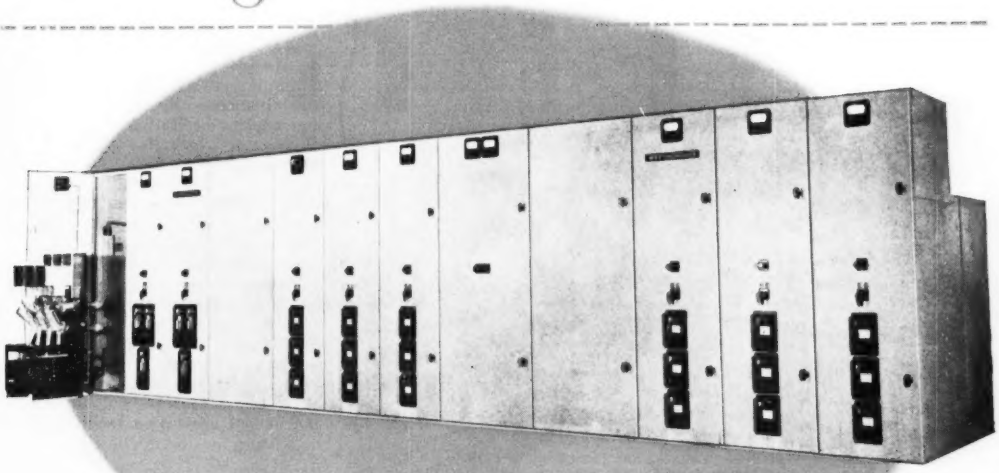
Westinghouse



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LONGER LIFE
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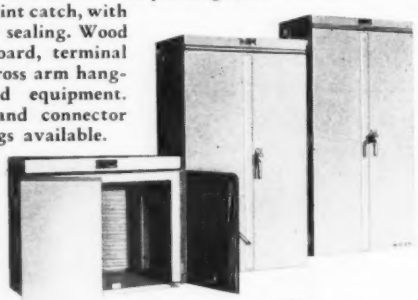

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ELECTRICAL WIRES AND CABLES BETTER THAN CODE REQUIRES

WAREHOUSES* AND SALES OFFICES: *Atlanta, Ga., Boston, Mass., *Chicago, Ill., Cleveland, Ohio, Dallas, Texas, *Detroit, Mich., *Kansas City, Missouri, *Los Angeles, Calif., *Newark, N.J., Philadelphia, Pa., *Portland, Oregon, *St. Louis, Missouri, *San Diego, Calif., *San Francisco, Calif.

LOS ANGELES COMMISSIONERS APPROVE REVENUE BOND ISSUE

Los Angeles Board of Water and Power Commissioners have authorized a $10,000,000 power revenue bond issue needed to complete the financing of a $51,320,000 construction program to take care of present and immediate future demands for electric energy.

Major expenditures are $4,750,000 to complete the Harbor steam plant in Wilmington, including additional oil storage facilities; $7,000,000 for new receiving and distributing stations, and $3,000,000 for construction of overhead and underground distribution lines to provide service for the city's increasing population.

Largest amount to be spent on any single project during the fiscal year is $25,120,000 for the Owens Gorge hydroelectric development project, according to Charles P. Garman, chief electrical engineer. Construction of three power plants will add 150,000 hp. of generating facilities.

Contract Renewal Approved For City of Redding

Power contract renewal between Pacific Gas and Electric Co. and the city of Redding has been approved by the California Public Utilities Commission. Voters recently turned down a contract for USBR power in favor of the PG and E contract (EWEST, July, p. 116).

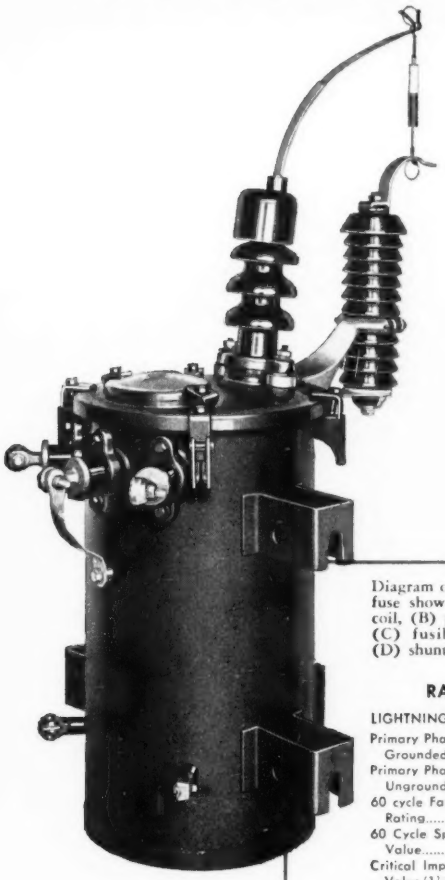
The new contract offers power at 10% below PG and E standard rates to municipalities and 5% below the former contract with Redding. It will continue until Aug. 26, 1955.

In permitting the company to reduce its rates to meet competition, the PUC said that "if it should appear in a rate proceeding that any losses are being incurred because of such adjustments, they will be treated as losses which are not to be imposed on other customers."

● THE IMPERIAL IRRIGATION District, with headquarters at El Centro, Calif., has sold $6,000,000 in electric revenue first division bonds to Blythe & Co. and 14 associated firms in the bidding. The bonds are part of a $12,500,000 bond issue authorized by voters at a special election last June. Bids for the remaining $6,500,000 will be asked at a later date, it was stated. The bond proposal was given more than an 80% majority and is the tenth issue of the district. Funds will be used to expand the publicly owned power system in the Imperial Valley.

LOW COST Protection

FOR YOUR *RURAL* TRANSFORMERS



Combination Lightning Arrester and Overload Limiter provides Complete, Low-Cost Protection on Allis-Chalmers Rural Distribution Transformers

COMPLETE PROTECTION for your rural transformers need not be economically out of reach — even on low revenue feeders.

Allis-Chalmers Rural Transformers with combination Lightning Arrester and Overhead Limiter offer as complete protection as you can buy . . . at a saving over many other types because of its simple, thrifty operating principle. By using this arrangement you can economically justify complete electrical protection for all transformers on your system.

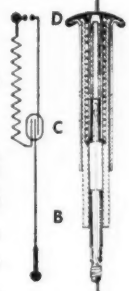
SURGE-PROOF OVERLOAD LIMITER

An important feature of this protective combination is the surge-proof overload limiter. Through special two-element fuse design, fuses rated small enough for low sustained tripping values can at the same time withstand momentary load current surges equal to ordinary fuse links rated 4 to 8 times higher! This provides protection against secondary shorts and harmful overloads, eliminates costly and unnecessary storm outages — yet permits safe, efficient utilization of Allis-Chalmers rural transformer overload capabilities.

The protected transformer comes to you completely assembled as a packaged unit, ready to install.

For further details, write for Specification 2557, or call your nearby A-C sales representative.

Diagram of two-element fuse shows (A) heater coil, (B) pull out wire, (C) fusible junction, (D) shunting gap.



RATINGS

LIGHTNING ARRESTER

Primary Phase to Phase Volts, Grounded 9000-13800
Primary Phase to Phase Volts, Ungrounded 6000-9000
60 cycle Fault Current Rating..... No Limit
60 Cycle Sparkover Value..... 34 KV
Critical Impulse Sparkover Value (1½x40 wave) 54 KV

OVERLOAD CUTOUT

Current Rating.... 50 amps
Maximum Interrupting Capacity .....1200 amps

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POLE SELECTION STANDARDS SUBJECT OF CONFERENCE

A group of Western pole suppliers has been conferring with Rural Electrification Administration over its pole selection standards. Upshot apparently will be a slight change in REA's engineering memoranda on the subject, but no alteration of the selection standards.

In conference with the agency's engineers, pole suppliers from the Montana-Idaho area protested that REA's standards adversely affected sales of lodgepole pine poles. They were particularly concerned over purchases of poles by REA borrowers in the Dakotas.

REA instructions to borrowers caution the latter to study annual costs before buying poles. The agency recommends a formula to ascertain annual cost. In brief, this formula involves the division of the installed cost plus cost of removal by years of life of the pole. This figure is then added to another, arrived at by multiplying installed cost plus removal cost by .011, to get annual cost.

REA's pole selection memo backed up this formula by applying it to hypothetical poles of varied costs and life. It was this application to which the pole suppliers particularly objected. REA may drop these cost calculations from the memo, but it is unlikely to change the basic formula.

New Electric Water Heating Rate Announced in B. C.

A new electric water heating rate for use in commercial and industrial establishments throughout the lower mainland, was announced last month by B. C. Electric.

The new rate is a straight 9-10 of a cent per kwh. Previously the lowest standard rate available to commercial and industrial customers was the commercial rate (2c per kwh.)

Minimum charge for service is $2.50 per month, regardless of installation size. Appliances must operate on standard voltage and 60 cycles. The new rate is not restricted to hours of use. Consumption is registered on a separate meter especially installed.

● SOLUTION of the fluorescent tube disposal problem is to be achieved the logical way — namely by eliminating the use of beryllium in the fluorescent powders coating the insides of the tubes. All manufacturers of lamps have decided on this procedure, and since June 1 all lamps made have been without beryllium. After stock made prior to that time is used up, disposal will not be a problem. Caution is urged in disposal of all old lamps, avoiding breaking them if possible, avoiding breathing of the powder should a lamp be broken and washing any of the powder from the skin, especially if there are any cuts in the skin. The situation, most lamp men feel, has been exaggerated and is not serious.

● B. C. POWER COMMISSION is planning a new office building at Victoria, B. C. Henry Whittaker, who recently retired as provincial government architect, and who has joined the B. C. Power Commission in a consulting capacity, is the architect in charge of the project. Cost of the project is estimated to be in excess of $300,000. Electrical consulting engineer is Lennox Mackenzie, Vancouver, B. C.

● STEVENS COUNTY Electric Cooperative of Colville, Wash., has awarded an $85,849 contract for construction of a headquarters building. The 93x59-ft. building will be of concrete and steel construction with brick veneer. The ground floor will house offices and a large meeting and display room. The basement will garage five trucks and house a general storage room.

● EDISON Electric Institute and Better Light Better Sight Bureau is offering revised terms for its planned lighting awards totaling $1,400 in cash prizes and plaques to electric utilities and their personnel. Grand prize of $500 and plaque will be given to the utility achieving the greatest success in the commercial, residential and industrial lighting fields. Three equal prizes, each of $150 and plaque, will be awarded for the best records in commercial lighting promotion. Two similar prizes will be given for residential lighting activities and one prize, also $150 and plaque, for industrial lighting promotion.

● TO KEEP the electrical industry informed of new developments in planned lighting sales activities Edison Electric Institute is forming a national planned lighting promotion committee. The committee will be organized on a regional basis with representation from all parts of the country.

● AS A REFERENCE in organizing local planned lighting programs Edison Electric Institute has prepared a new brochure, *The Facts of Light*, with detailed information on successful planned lighting programs sponsored by electric companies in the commercial, residential and industrial markets. In addition the brochure presents the entire group of planned lighting sales aids available in 1949-50.

This heavy duty lubricating oil

Time between overhauls

Because it's fortified against ***ALL*** the inside causes of reduced engine life

SHELL TALONA OIL

FOR ALL YOUR HEAVY DUTY ENGINES

SHELL

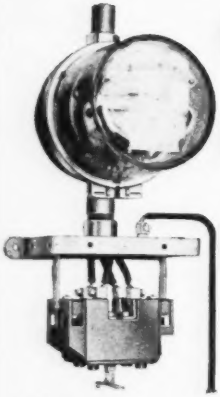
To add hundreds of extra hours to the previous running time between engine overhauls . . . yes, Shell scientists aimed high when they started to develop a new heavy duty oil. They knew that such an oil must overcome not just some of, but *all* the inside causes of reduced engine life: sludge . . . carbon . . . lacquer . . . acids . . . and their end-product, wear.

To make a long story short — and sweet — Shell scientists found a formula that made even their original ambitious goal seem modest: Shell Talona Oil.

In all types of heavy duty, high speed engines — both gasoline and Diesel — Shell Talona Oil has surpassed every accepted standard for heavy duty oils. It has kept sludge to a harmless minimum; protected alloy bearings from corrosion; left pistons and rings virtually free of carbon and lacquer; kept wear so small it was hard to measure. All to the end of keeping such engines going longer . . . and more efficiently.

Why don't you find out what Shell Talona Oil can do for your heavy-duty equipment?

KEES METER SERVICE SWITCHES



OUTDOOR
All models completely enclosed in heavy 16-gauge steel cases. No openings where moisture and dirt can enter.

WEATHER-PROOF
Solid, tight fitting cases provide maximum protection against weather conditions.

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Enclosed switches may be sealed or padlocked to prevent damage from unauthorized use.

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NEWS ABOUT PEOPLE

● SOUTHERN CALIFORNIA EDISON CO. has announced the following changes in its operating department: G. R. WOODMAN, superintendent of hydro generation, has been appointed superintendent of generation, with supervision of the hydro, steam and diesel generation divisions. A. C. WERDEN, former assistant superintendent of hydro generation, succeeds Woodman. T. C. STAVERT, former superintendent of southern division hydro, has become assistant hydro superintendent.

● MARTIN MONTGOMERY has assumed duties as electrical engineer for Industrial Electricians Ltd., Vancouver, B. C. Associated with the electrical industry for 25 years, Montgomery was former district engineer in British Columbia for Canadian Westinghouse Co. Prior to his appointment he was representative and district manager for the English Electric Co. of Canada at Vancouver.

● L. E. JENKINS, former district manager for Southern California Edison Co. at Monrovia, has been appointed Redondo Beach district manager. He succeeds the late C. C. Bartlett. At the same time C. O. WEDBERG, former office manager at Compton, was appointed district manager at Monrovia.

● C. D. SMITH has become Delano district manager for Southern California Edison Co., succeeding G. H. SULLIVAN, who has moved to the general office as an agricultural service advisor. Smith had been office manager at Ventura for the company since 1941.

● W. E. MONTGOMERY, former assistant operating engineer of Southern California Edison Co., has been appointed operating engineer to succeed the late P. H. Gilbert. A. G. DENYER will take over Montgomery's former position.

● D. M. JONES, a graduate of Washington State College and manager of the central station engineering division of General Electric Co., Schenectady, retired recently after 32 years of service with the company.

● FRANCIS E. BOYD, president of Pacific Electric Motor Co., Oakland, has been appointed to the board of directors of the East Bay Municipal Utility District.

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- *Where to use Preassembled Aerial Cable*
- *Field-assembled Aerial Cable*
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● HOWARD N. WALTERS, general sales manager of B. C. Electric Railway Co., and newly elected president of the Northwest Electric Light & Power Assn., was born in Minnesota, educated in England, Manitoba and Minnesota, fought five years in World War I and worked in New Haven, Conn., and London, England, before coming into the electrical industry. He left Lines Bros., London, in 1925 and came westward across the American continent to Vancouver, B. C., to join the B. C. Electric in 1926, becoming manager of the company's retail store in Vancouver. From 1943 to 1945, on loan by the company to the National War Finance Committee, he served as director of war savings in British Columbia. On rejoining the company, he became successively director of industrial development, acting sales manager and general sales manager.

● NICHOLAS M. DUCHEMIN, manager of the meter and instrument division of General Electric Co. at Lynn, Mass., has been appointed an assistant general manager of the G-E apparatus department. He has been assigned to several divisions including the Oakland works.

● HOWARD E. BOSS has been appointed laundry equipment specialist for Westinghouse Electric appliance division for the Pacific Coast District. In 1945 he joined WESCO in San Francisco as laundry equipment salesman and held that position until his recent appointment.

● LAWRENCE PALMER, associate engineer for Puget Sound Power & Light Co., Seattle, has been promoted to engineer for the company. He replaces CARL MYERS, who has taken a position with Ebasco in New York.

● HAROLD M. HANSEN, former district appliance manager for Westinghouse Electric Supply Co., Los Angeles, has been made district appliance and radio manager for the firm, headquartered at Los Angeles.

● JOHN D. DAVIS, formerly commissioner of employment for the state of Washington, has been appointed chief of the Washington, D. C., office of Bonneville Power Administration.

● L. M. KLAUBER, chairman of the board of San Diego Gas & Electric Co., has been elected president of the Pacific division, American Association for the Advancement of Science.

● EARL BAUGHN, chief electrical engineer of the Washington Water Power Co., and DR. H. K. BENSON, chemical engineering professor at the University of Washington, have been appointed to the Washington state board of registration for professional engineers and surveyors.

Walters

● FRANCIS K. MCCUNE, assistant to the general manager of General Electric Co.'s apparatus department, Schenectady, has been appointed assistant general manager of the G-E nucleonics department. His headquarters will be at Richland, Wash., where the nucleonics department operates the Hanford Works for the Atomic Energy Commission.

● CARL F. MYERS, formerly engineer in charge of overhead construction for Puget Sound Power & Light Co. at Seattle, has accepted a position with the Electric Bond & Share Co., New York. Lawrence Palmer, associate engineer of Puget Sound Power & Light, succeeds Myers as engineer.

● F. M. DRAKE, general sales manager of the New York branch of Frigidaire Sales Corp., has been promoted to manager of the Los Angeles branch. Drake succeeds E. L. WILLIAMS, who has been transferred to the Pacific region.

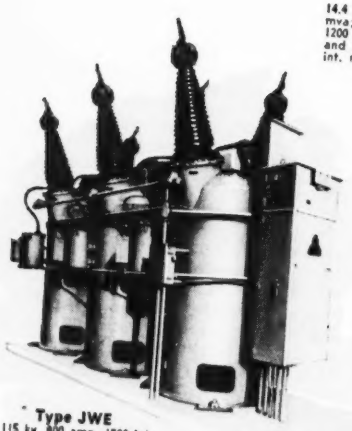
● W. J. HOWELL, former assistant to the Pacific Coast district manager of Westinghouse in San Francisco, has been appointed assistant to Tomlinson Fort, manager of apparatus sales for Westinghouse at Pittsburgh.

● APPOINTMENT of R. E. James as appliance sales manager for the Western region of Rheem Mfg. Co. has been announced by C. V. Coons, vice-president in charge of sales.

● HARVARD H. HILL has assumed the duties of branch manager of the Phoenix branch of Gough Industries Inc., electrical distributors.

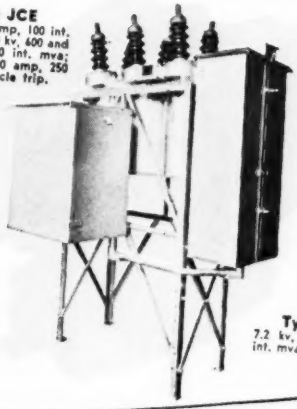
OIL CIRCUIT BREAKERS

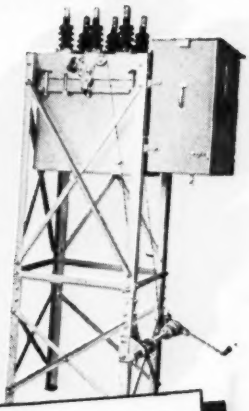
for Outdoor High-Voltage Stations . . .



Type JWE
115 kv, 800 amp, 1500 int. mva, 5-cycle trip.

Type JCE
14.4 kv, 600 amp, 100 int. mva; also 14.4 kv, 400 and 1200 amp, 250 int. mva; and 23 kv, 600 amp, 250 int. mva, 8-cycle trip.





Type AKE
7.2 kv, 600 amp, 50 int. mva, 8-cycle trip.

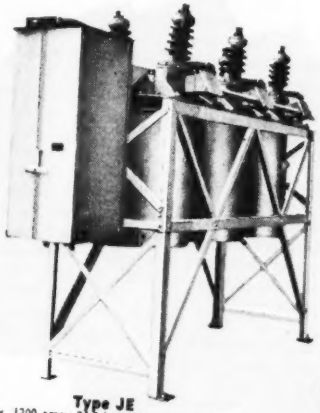
Reliability and Low Maintenance

All Pacific breakers, large and small, embody the **same** time-tested design elements:

(1) **Motor-Compressed-Spring Stored-Energy Operating Mechanisms** assure identical opening and closing times, regardless of frequency of operation.

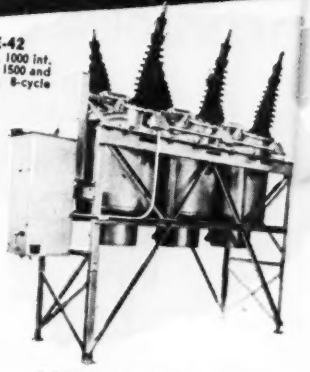
(2) **Arc-Expulsion Chambers** with directed gas blast extinguish arcs without appreciable rise of tank pressure or burning of contacts.

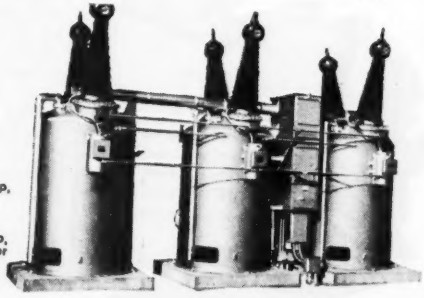
(3) **Sliding Shoe Contacts** with **Leaf-Type Pressure Springs** eliminate stress on bushings, require no sensitive adjustment to maintain pressure or fix closed position. Wiping action reduces pitting. Restrikes reduced because contacts separate only when traveling at high speed.



Type JE
23 kv, 1200 amp; 34.5 kv, 600 amp, both 500 int. mva; and 34.5 kv, 1200 amp, 1000 int. mva; also 46 kv, 600 amp, 500 int. mva, and 1200 amp, 1500 int. mva, 8-cycle trip.

Type JE-42
69 kv, 600 amp, 1000 int. mva; 1200 amp, 1500 and 2500 int. mva, 8-cycle trip.





Type RWE
115 kv, 138 kv, and 161 kv, 1200 amp, 3500 int. mva, 5-cycle trip.

Type RHE
Is similar, for 138 to 230 kv, 800 amp, 5000 int. mva; or 1200 amp, 7500 or 10,000 int. mva, 3-cycle trip.

AIEE and NEMA Standards

Call **Get All Facts . .**

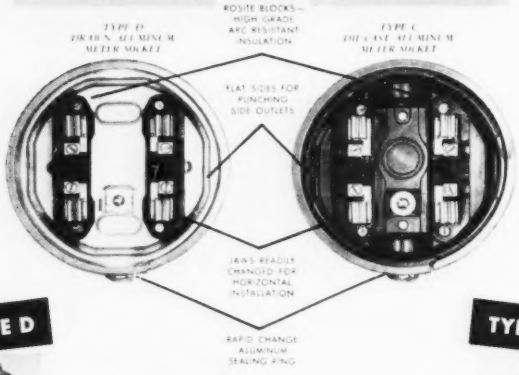
PACIFIC ELECTRIC MFG. CORPORATION

5815 THIRD STREET, SAN FRANCISCO 24, CALIFORNIA • P. O. BOX 419, GARY, INDIANA

C. H. CUTTER, 912 Securities Bldg., Seattle 1, Wash.
G. B. KIRKWOOD, 437 S. Hill St., Los Angeles 13, Calif.
J. E. REDMOND SUPPLY CO., 625 W. Madison St., Phoenix, Ariz.
ORMONDE SMITH, JR., 3842 Palm Ave., Houston 4, Texas
MARRS & WENDEGATZ, 526 Dwight Bldg., Kansas City 6, Mo.
L. CLAIR MITCHELL CO., 306 Commonwealth Annex, Pittsburgh 22, Pa.
F. W. GORMAN, P. O. Box 223, El Paso, Texas
H. R. SLOCUM CO., P. O. Box 1692, Honolulu, T. H.
PIERCE G. FREDERICKS, 90 West St., New York 6, N. Y.
ARKANSAS ELECTRIC CO., 316 Louisiana St., Little Rock, Ark.
WILLIAMSON & WILMER INC., 617 Mutual Bldg., Richmond 19, Va.
LEONARD M. SLUSSER, 318 Dooly Block, Salt Lake City 1, Utah

Other Representatives in Principal Cities

DUNCAN METER SOCKETS


TYPE D
DUCAST ALUMINUM METER SOCKET
ROSITE BLOCKS—HIGH GRADE ARC RESISTANT INSULATION
TYPE C
DUCAST ALUMINUM METER SOCKET
FLAT SIDES FOR PUNCHING SIDE OUTLETS
JAWS READILY CHANGED FOR HORIZONTAL INSTALLATION
RAPID CHANGE ALUMINUM SEALING RING

TYPE D

DESIGNED FOR CABLE BUT MAY BE USED WITH CONDUIT

TYPE C

DESIGNED FOR CONDUIT BUT MAY BE USED WITH CABLE

For Installation Economy!

USE the socket designed for the job. Do you use cable—then the Type D provides the best installation at unequalled economy. If you use conduit; the Type C is the answer. Applicable to *most* residential and small commercial services, both Type D and Type C are readily adaptable to either cable or conduit, using standard available fittings; thereby reducing the number of items for stock. Both meet all requirements for standardization.

makers of meter sockets for nearly fifty years

DUNCAN ELECTRIC MFG. CO. LAFAYETTE, INDIANA

ALL KINDS
of SMALL
TRANSFORMERS

—in the JEFFRIES line

Practically all your small transformer needs are supplied by the Complete Jeffries line. We have specialized for years in providing transformer to exactly match your requirements. If not in our regular line, we build to meet your specifications in a hurry!

Minimize your voltage losses. Specify scattered transformers to eliminate duplicate conduit runs, and save on power costs.

JEFFRIES TRANSFORMER COMPANY
1710 E. 57th St. Los Angeles 11, Calif.

Minerallac
JIFFY CLIPS

SAVE TIME when hanging pipe, conduit, BX cable, etc., by using these strong ribbed JIFFY CLIPS. Only one bolt or screw is required. Their expert design and quality materials will assure long, trouble-free service at a surprisingly low cost.

AVAILABLE NOW in Cadmium plated steel or Everdur.

Ask Your Jobber for
JIFFY CLIPS

GEO. E. HONN CO.

Phone Sutter 1 7352
420 Market St. San Francisco, Cal.

● R. O. BARNES has assumed duties as Pacific district manager for General Cable Corp., succeeding the late James E. Crilly. Barnes will be located at 25 Beale St., San Francisco. W. E. WARNICKE is the new South Pacific district manager for the firm, headquartered at Los Angeles. He succeeds J. C. PYLE, who is on leave of absence.

● WARD M. DOLAND has been appointed Seattle district sales manager for the Deepfreeze Division of Motor Products Corp., succeeding R. R. HARNISH, who was promoted to Western regional sales manager recently, filling the vacancy caused by BEN G. SANDERSON, who was made manager of field sales out of the firm's Chicago headquarters.

● WILKES LAMBIRTH, formerly district manager at Victorville for California Electric Power Co., has been advanced to commercial agent in the Riverside office of the company. He will assist the general commercial manager. Reg Knaggs has taken over the duties of district manager in the Victorville district.

● ROY M. BUTCHER, head of one of the largest electrical contracting firms in San Jose, has left for a five-month trip to the Belgian Congo to take motion pictures for African Films Inc. of which he is vice-president. Butcher's expedition climaxes a life-time photography hobby.

● JOHN C. HEWITT, an electrical inspector for the city of Seattle, succeeds THOMAS L. MATNEY as chief electrical inspector for the department of labor and industries for the state of Washington. Matney recently resigned the position.

● DOUGLAS SAUER, recently connected with the American Gas & Electric Co. of New York, has been appointed assistant hydraulic engineer for British Columbia Electric Railway Co.

● W. CROMPTON, formerly with Northern Electric Co. of Vancouver, B. C., has joined the Vancouver branch of Moffats Ltd., as assistant to Harold Stewart.

● ALAN S. FITZGERALD, electrical research engineer of San Francisco, has been awarded the Louis Edward Levy medal of the Franklin Institute of the state of Pennsylvania.

● DAVID HOPKINS, field sales representative for Emerson Radio & Phonograph Corp., has been advanced to Western sales manager for the company.

● HAROLD Q. NOACK has resigned as Pacific Coast manager of Phelps Dodge Copper Products Corp. to accept a position as an assistant to O. L. Pringle, vice-president in charge of sales of Columbia Steel Co. He will handle assignments in connection with Columbia's customer relations program.

● DR. RONALD R. SCHEUCH has been named a research associate in the department of electrical engineering of Stanford Research Institute. He has been assigned to assist with the development of a single sideband suppressed carrier transmitter which the institute is designing for the Army Signal Corps.

● JAMES B. DU PRAU has been elected to the newly created position of vice-president-administration of Columbia Steel Co., San Francisco. He will also continue as a member of the board of directors. Du Prau has been with the company since 1935.

● GEORGE E. CONGDON, formerly with the Westinghouse lamp division at Los Angeles, has been named branch manager for the division's San Francisco office. Congdon joined Westinghouse in 1937 in the sales department of the lamp division at Detroit.

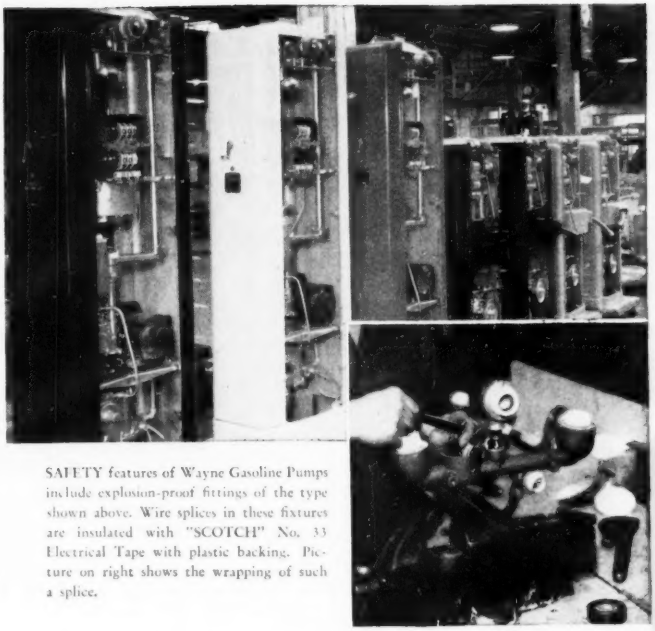
● JOHN A. DEGROOT has been transferred to the San Francisco office of Westinghouse as assistant to the Pacific Coast district manager, according to Charles A. Dostal, vice-president of Westinghouse. DeGroot was formerly with the firm at Pittsburgh.

● FRANK A. STORTZ JR., has taken on duties as traffic appliance sales manager for the San Francisco district of General Electric Supply Corp., succeeding V. L. HOBSON, who has become manager of appliance sales for GESCO in the Seattle district.

● ANNOUNCEMENT has been made of the appointments of Tom Hadwin to superintendent of substations, and Chubb Anott to supervisor of generating stations, B. C. Electric Railway Co.

● JOSEPH W. DOAN, formerly appliance sales manager for Frigidaire's Pacific region, has been appointed manager of the company's quantity sales division with headquarters in Dayton.

● HUGH O'NEILL, formerly in charge of the San Francisco office of the Estate Heatrola Division, has been appointed sales representative in northern California for General Sales Corp., San Francisco.



SAFETY features of Wayne Gasoline Pumps include explosion-proof fittings of the type shown above. Wire splices in these fixtures are insulated with "SCOTCH" No. 33 Electrical Tape with plastic backing. Picture on right shows the wrapping of such a splice.

Get perfect "tight spot" insulation with this tape

All splices of electric wiring in explosion-proof fittings on Wayne gasoline pumps are made with tough, impervious, plastic-backed "SCOTCH" No. 33 Electrical Tape. The thinness of this tape together with its high dielectric and mechanical strength makes it ideal for insulating splices in tight quarters in a one-tape-one-operation job.

Write Dept. EP-9 for sample and booklet.

QUICK FACTS ABOUT "SCOTCH" No. 33 Electrical Tape

- *Thin caliper*—only .007 inch thick, takes less room in junction boxes, conduits, fittings.
- *High dielectric strength*—over 7,000 volts
- *Tough*—plastic backing is abrasion resistant, unaffected by water, acids, alkalies, alcohols.
- *Stretchy*—conforms snugly to uneven surfaces.

Made in U. S. A. by
MINNESOTA MINING & MFG. CO.
St. Paul 6, Minnesota
3M COMPANY

General Export: DUREX ABRASIVES CORP., New Rochelle, N. Y.
In Canada: CANADIAN DUREX ABRASIVES LTD., Brantford, Ontario

Inspecting a 230-kv. 10,000,000-kva., 3-cycle Pacific Electric Mfg. Corp. oil circuit breaker during the recent San Francisco AIEE meeting are, from left, E. F. Sixtus, vice-president, Pacific Electric Mfg. Corp.; Clive E. Baugh, electrical distribution engineer, Pacific Gas and Electric Co.; Harry P. St. Clair, system planning engineer, American Gas & Electric Service Corp.; George C. Tenney, president, McGraw-Hill Co. of California, and Pierce G. Fredericks, president, P. G. Fredericks Inc.

● Steven C. Van Voorhis, formerly with General Electric's San Francisco apparatus department advertising and sales promotion office, has been appointed manager of advertising and sales promotion for the newly formed Michigan District of G-E's apparatus department.

● E. H. Stan Klatt of Purvis E. Ritchie & Son Ltd., Vancouver, B. C., has been appointed company sales manager for British Columbia, according to P. E. Ritchie, president.

● Appointment of Daryl C. Stephenson as chief field engineer for the B. C. Power Commission, Victoria, B. C., has been announced.

● John R. Ford, at one time representative for Jefferson Electric Co., with headquarters in Seattle, has been appointed general sales manager of the company, with main offices at Bellwood, Ill.

● Dr. Harry L. Purdy has been appointed director of research and administrative controls for the British Columbia Electric Co. at Vancouver. Alan J. MacDonald, former planning assistant in BCE's transportation and gas divisions, has been named his assistant.

● E. H. Tredcroft, district engineer for the provincial water rights branch at Kelowna, B. C., has been appointed chief engineer of the department. He succeeds D. K. Penfold, who was recently named to the public utilities commission.

● Lane D. Webber, vice-president of Southern California Edison Co., has been appointed to direct the company's public relations department, according to an announcement by W. C. Mullendore, president. W. C. McWhinney, assistant vice-president, will be associated with Webber in directing the department.

● Clarence J. Bachman, 54, Pacific Coast regional manager of the Kelvinator division of Nash-Kelvinator Corp., died at Berkeley, Calif., recently. Mr. Bachman joined the Kelvinator sales department at Detroit in 1938 and became manager of the Dallas branch that same year. He was appointed Pacific Coast regional manager in 1939.

● P. H. Gilbert, operating engineer for Southern California Edison Co. since 1946, was killed instantly on July 9 when the automobile in which he was riding collided with a diesel truck in an underpass on the main highway north of Bakersfield. Mr. Gilbert joined the Edison company in 1917 as an assistant operator at the Big Creek-San Joaquin River hydroelectric development in the High Sierra.

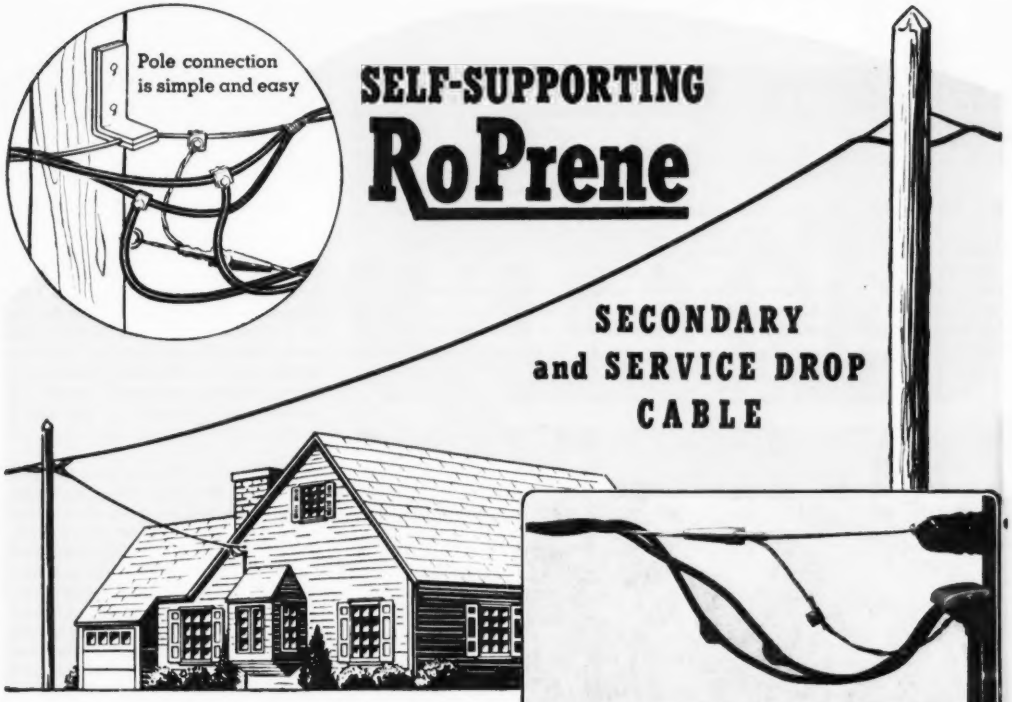
● Col. Robert B. Marshall, 82, father of California's Central Valleys project, died recently in San Francisco. He spent 30 years of his life gathering the engineering data necessary to bring to reality his plan of storing in dams the rain waters of the Sacramento, San Joaquin, and Santa Clara valleys and southern California. For several years he was associated with the state division of highways, retiring in 1938. Following his death the California Assembly adopted a resolution acknowledging the state's debt to him "for his vast contribution to the development of the wealth and heritage of this state."

● Jesse O. Tobey, 67, consulting engineer for Sacramento Municipal Utility District, died recently in Sacramento. He started his career in 1901 as a lines instructor for Northern California Power Co., and later became electric foreman and assistant superintendent for the San Jose power division of Pacific Gas and Electric Co. He went to Sacramento in 1910 as the Sacramento power division superintendent. In 1946 Mr. Tobey retired from PG and E as electrical superintendent of the Sacramento division.

● Jesse H. Hitchcock, 74, retired superintendent of Pacific Gas and Electric Co., San Francisco, died recently of a heart ailment.

SELF-SUPPORTING RoPrene

SECONDARY and SERVICE DROP CABLE



Service drop connection to house simplified with fittings and hardware commercially available.

Photo courtesy Fargo Mfg. Co., Inc.

FOR ECONOMY IN AERIAL SERVICE

As a new development of time-proven construction, RoPrene Secondary or Service Drop Cable consists of RoPrene (Neoprene) insulated power conductors, spiralled around a "straight-away" neutral conductor for mechanical support. Here is simplicity in construction, economy of installation, longer life under all weather conditions . . . plus the neater appearance of a single cable assembly compared to open wires.

These advantages can be yours:

Lower Cost
Ease and Economy of Installation
No Mechanical Stress on Power Conductors
No Coverings to Rot and Festoon
High Weather Resistance
Reduced Maintenance
Neat, Compact Appearance
Versatility

Write today for bulletin RS-4. See for yourself why, more and more, RoPrene Secondary and Service Drop Cable is becoming the accepted cable for overhead services. Available in a wide range of types and sizes.

FROM BAR TO FINISHED WIRE

ROME CABLE CORPORATION

ROME • NEW YORK

PACIFIC COAST SALES OFFICES

SALT LAKE CITY 1, UTAH
462 Union Pacific Annex Bldg.

LOS ANGELES 21, CALIF.
2038 Bay Street

SAN FRANCISCO 3, CALIF.
1045 Bryant Street

SEATTLE 4, WASH.
3404 Fourth Ave., So.

NOTES ON THE TRADE

● S & C Electric Co. has appointed H. J. Randolph, electrical engineer of Boston, to represent its products in southern California. Randolph will maintain offices at the Quimby Bldg., Los Angeles. R. E. Cunningham & Son formerly represented S & C products in that region.

● Paul Watts, Pacific Coast manager of Skilsaw Inc., Chicago, has been appointed general sales manager of the company, according to Bolton Sullivan, president. Watts, who has been making his headquarters in San Francisco, will move to the company's enlarged plant and main offices in Chicago.

● Lenkurt Electric Co., San Carlos, has announced the incorporation of a Canadian subsidiary company with its plant located at 926 Hastings St., Vancouver, B. C. Manufacturing and assembly operations will be carried on there by the subsidiary company, Lenkurt Electric Co. of Canada Ltd.

The two crated transformers shown are consigned to a South American sanitary project—part of a 45 unit shipment from Gardner Electric. In foreign service as well as here at home in the Western states, Gardner transformers have maintained their fine record of efficiency under widely varying conditions of operation, power supply, and output requirements.

Gardner Electric Mfg. Co.
EMERYVILLE 8 CALIFORNIA
Representatives
WEST COAST
MAYDWELL & HARTZELL, INC.
MOUNTAIN STATES
ELECTRICAL SPECIALTY CO.
GARDNER TRANSFORMERS GUARD PROFITS

● Multi-Products Co., Los Angeles, has purchased the Elcon Mfg. Co.'s commercial line of wiring devices and will produce Elcon switches, outlets and plates in addition to its original line of Duro all-steel conduit fittings. The Elcon firm is withdrawing from the commercial field to produce high altitude equipment for the air forces. At the same time Multi-Products has made arrangements for the sale and distribution of flexible conduit and cable fittings, previously made by Commercial Casting Co., which will be taken into the Duro line.

● Permanente Metals Corp. has purchased the Newark, Ohio, aluminum rod and bar mill from the War Assets Administration. Purchase price was $4,500,000, and the company will spend an additional $4,500,000 for purchase and installation of wire and cable-making equipment. One of six aluminum plants operated by Permanente, the plant has been under lease to the company and made its first deliveries of electrical conductor in July.

● General Electric lamp department has established a Puget Sound sales district with headquarters at the Hoge Bldg., Seattle, which will be managed by Lloyd R. Wilson, former manager of the North Pacific sales district at Portland. Walter J. Pitblado, manager of the Portland service district, succeeds Wilson. Alex C. Ham has been named Portland service district manager.

● W. E. Pickrell has been appointed manager of Salem Lighting & Appliance Co., replacing Paul Yeater. Pickrell was formerly a lighting specialist with Stubbs Electric Co., Portland. On August 1 Salem Lighting & Appliance became exclusive agents for the Lightolier lighting fixture line in the Salem area.

● Clyde Allen Co., San Francisco, has been appointed to represent the Manning-Bowman Co. of Meriden, Conn., covering the northern California territory. New headquarters and showroom of the Clyde Allen Co. are to be located on the fourth floor of the Western Merchandise Mart.

● William J. Moreland Jr. has assumed duties as vice-president in charge of manufacturing for Conrac Inc., Glendora, manufacturer of television receiving sets. Moreland was formerly head of development engineering for the Altec Lansing Corp.

● WESTERN APPLIANCE Corp., Denver, recently opened its new major appliance distribution center at 201 S. Cherokee St. The building consists of general offices, display rooms and a warehouse. Distribution by the company covers Colorado, western Nebraska and most of Wyoming. Major lines handled are Kelvinator and Leonard products, Zenith radios, Duo-Therm heaters, Ironrite ironers, Fowler water heaters and Morton kitchen equipment. L. F. Skutt, president, founded the company in 1944.

● APPOINTMENT of Charles S. Conrad as director of steel sales for Tay-Holbrook Inc., distributor of industrial, sheet metal and plumbing supplies, San Francisco, was announced by J. Milton Hagler, president. Conrad resigned as general manager of sales for Columbia Steel Co. to accept his new position.

● COMBUSTION ENGINEERING - SUPERHEATER INC. has appointed H. D. Nickle as manager of its new district office for the Northwest territory including the states of Washington and Oregon. Nickle will make his headquarters in Seattle.

● ROSENDIN ELECTRIC WORKS, San Jose, has been appointed Santa Clara county dealer for Allis-Chalmers motors, controls, centrifugal pumps and transformers, and a certified service shop for the company's motors, transformers and controls in the same area.

● BERNARD M. CEAZAN has been elected president of the J. N. CEAZAN Co., Los Angeles, wholesale distributors of electrical appliances. He succeeds his father, Julius Ceazan, who will remain as board chairman.

● S. M. WILDER has been appointed southern California division manager for Duchess washing machines, it was announced by F. W. McGrath, vice-president in charge of sales for Appliance Mfg. Co.

● ALBERT M. SOLEN Co., Denver, has been appointed district merchandisers for the complete line of Kalamazoo home appliances and heating equipment in the states of Colorado, Wyoming and Utah.

● GAROD ELECTRONICS CORP. has appointed the L. K. Franklin Co. Inc., Los Angeles, as exclusive distributor for its television and radio products in the southern California area.

● ARVIN DIVISION of Noblitt-Sparks Industries Inc. has appointed Earl Rogers as assistant to James L. Hofer, Western district manager. Rogers will headquarter at Berkeley.

The man on the pole will tell you—

KLEINS

Since 1857

If you know linemen, you know they want the finest in quality when it comes to equipment. Not only does their job depend on it—many times their lives do.

It is the reputation of nearly a century in designing and manufacturing the finest in linemen's equipment that has won Klein its position of preference with linemen and electricians everywhere.

It is easy to make equipment that looks like Kleins. It takes years of experience plus extensive manufacturing facilities to make equipment that performs like Kleins.

Today you are assured prompt delivery on all Klein products. Be sure your pliers, climber straps, safety belts and other items carry the Klein trade-mark—famous for quality "since 1857."

ASK YOUR SUPPLIER
Foreign Distributor:
International Standard Electric Corp., New York

The Klein Pocket Tool Guide showing the Klein line and containing useful tool information will be mailed on request.

Mathias KLEIN & Sons
Established 1857 Chicago, Ill., U.S.A.
3200 BELMONT AVENUE CHICAGO 18 ILLINOIS

● RECENT SYLVANIA West Coast assignments include the naming of H. H. Allison as field engineer in the California lighting division. Pending completion of studies now being made for setting up a Sylvania West Coast fixture manufacturing plant, Allison will also act as plant manager. Herman L. Schriener has been named field representative in southern California for the lighting division, working out of the Los Angeles office. Bob Bardsley has been transferred from Sylvania's Chicago division to Seattle, where he will act as lighting engineer for the Northwest division. Harold MacArthur was recently added to the Seattle office staff as field representative of the lighting division. Ted Atcherely has been appointed division manager of distributor sales, radio tube division, for the Northwest. Robert W. Thunen, formerly with Pacific Gas and Electric Co., has been transferred from commercial engineering for Sylvania, to its sales department, serving as fixture specialist in the Bay Area. Carl S. Long Jr., has been appointed lamp specialist in the Bay Area. Philip A. Carlstroem has been transferred from the Oakland area to Sacramento for Sylvania.

● A "GET ACQUAINTED" package offer is being made to electrical contractors by the Briegel Method Tool Co. of Galva, Ill., according to Ernest F. Hauck of San Francisco, Briegel representative. From Sept. 1 through Nov. 30, or until canceled, one No. 605 1/2-in. standard indenter will be given with each order for 400 1/2-in. connectors and 200 1/2-in. couplings. Other Briegel distributors in the West are J. G. Pomeroy, Los Angeles; W. W. Wheat & Associates, Seattle; James Blinn Co., Denver.

● CHANGES in the Western organization of Frigidaire include the appointment of R. E. ROBERTSON as assistant to W. I. BUCHANAN, Western regional manager in San Francisco. Robertson is succeeded in his former position as branch manager at Oakland by H. J. MILLER.

● E. B. SIMMONS has been appointed manager in northern California for Antenna Distributors Inc., with headquarters in the Western Merchandise Mart, San Francisco.

● JAMES L. FOUCH, for 18 years with the Universal Microphone Co., has been named sales manager for the Cinema Engineering Co., Burbank, Calif.

● GENERAL ELECTRIC has formed a new Northwest sales district for its construction materials department which will serve Seattle, Spokane, Portland, Boise, Salt Lake City, Butte and Billings. William W. Bryan will serve as manager of the new district.

● THE CONSTRUCTION MATERIALS department of General Electric Co. has opened its new Pacific district warehouse at Los Angeles, where Daniel F. Flynn, Pacific district manager, will be located. George F. Kingshot has been named operating manager of the new warehouse.

● THERMADOR ELECTRICAL Mfg. Co. of Los Angeles has appointed John R. Weber of Seattle as sales manager of its Northwest division, covering Washington, Oregon and northern parts of Idaho and Montana. Weber formerly was associated with the Huletz Electric Co., and more recently served as sales representative for W. W. Wheat & Son.

● M. F. GILLERN, specialty sales manager of Cannon Electric Development Co., Los Angeles, recently announced the appointment of Charles F. Fouts to his staff. Fouts has been with the company since 1941.

● JACK ENOCH has joined the Lee Arter Co., Los Angeles manufacturers representatives. He was formerly with Jensco Tool Division, General Steel Warehouse Co., as representative in the eleven Western states.

● A. D. WUNDER Co., formerly at the Western Merchandise Mart, has moved its general office and warehouse to 274 Brannan St., San Francisco. Adrian B. Greenberg and R. E. Briese are the new owners of the firm, which distributes Enterprise ranges and heaters.

● APEX ELECTRICAL MFG. Co., Cleveland, Ohio, has opened a district office in Portland, with M. M. Curtis, former president of Household Distributing Co., in charge.

● A NEW BRANCH of the Coast to Coast Stores opened recently at Colfox, Wash., under the management of R. A. Becker.

● PAUL R. BROUSSE was appointed Western zone manager at San Francisco of Western Electric Co. on August 1, succeeding C. H. Hanson, who was made manager of the company's plant in Tonawanda, N. Y.

● THE ELECTRIC Corp., wholesale electrical supplier, Los Angeles, has announced appointment of Dewey W. Peterson to its executive staff, serving as sales manager. Peterson was formerly associated with WESCO in Los Angeles, most recently as manager of its apparatus and supply department.

● THE REMBRANDT line of television receivers, made by Remington Radio Corp., will be distributed in northern California by the television division of San Francisco Radio & Electric Co. The San Francisco firm has also been appointed a distributor for Hallicrafter products and Cunningham tubes.

● MCCORMACK & Co., San Francisco wholesale distributors, has appointed Helmuth Tamberg as field sales manager for all products distributed by the company. Tamberg has been associated with McCormack for several years.

● CHANGES within the organization of the Leo J. Meyberg Co., San Francisco, include the appointment of E. J. Halliday to sales manager of the Norge division, and J. F. Templeton Jr., to manager of inside sales and administration of major appliances.

● DALCO APPLIANCE Co., San Francisco, has taken on distribution in northern California and western Nevada for Temprex radiant heat clothes dryers, made by Appleman Glass Workers, Bergenfield, N. J.

● HOWARD WINDSOR, Kurt Verson Co., San Francisco, has been appointed a representative for Cross Lighting Co., makers of showcase lighting, Los Angeles. His territory will cover northern California.

● TRI-STATE SUPPLY Corp., with warehouses in Los Angeles, San Francisco and Seattle, is installing a fleet of new one-ton pick-up trucks for speeding up metropolitan services, it was announced by C. F. Bowers, president.

● ALLIED FINISHING SPECIALTIES Co., Chicago, has appointed Mission Electric Mfg. Co., Pasadena, as its Western sales representative.

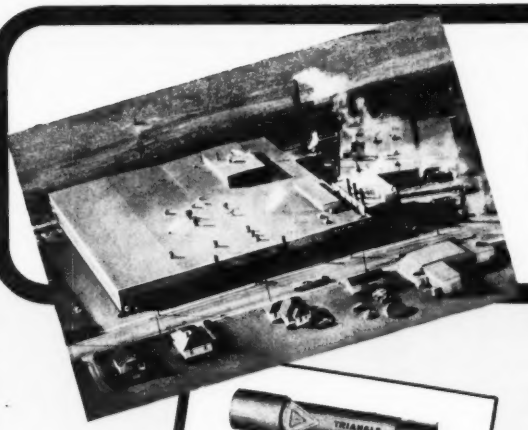
● WILLIAM BAIN, formerly with the San Francisco office of Sues, Young & Brown, has joined the Frank Edwards Co., San Francisco, as a territory representative in the north and south coast areas.

● GOUGH INDUSTRIES INC., Phoenix, has been appointed a distributor for Youngstown Kitchens, serving the Arizona territory, according to the Mullins Mfg. Corp.

● LOGAN SALES Co., San Francisco, has been named sales representative for Starrett Television Corp.

● FROST INDUSTRIAL ELECTRICAL Co., Burbank, Calif., has announced the marketing of electrical heating elements for industrial application.

TRIANGLE'S NEWLY EXPANDED CONDUIT PLANT



Triangle Rigid Steel Conduit finish is hot dip galvanized, uniformly both inside and outside, with additional protection assured by a baked-on coat of specially prepared linseed oil base lacquer. Available in sizes from ½ to 6 inches, with couplings and elbows to fit.

Triangle Electric Metallic Thin Wall Conduit is welded from high grade steel strip, insuring a perfectly true tube of uniform thickness and strength. Hot dip galvanized uniformly both inside as well as outside. Threadless. Available in ½ through 2 inch sizes.

Now your requirements for rigid steel and thin wall conduit can be met faster, more dependably, since Triangle's newly expanded plant is in production. Located in Moundsville, W. Va., hard by the steel center of Wheeling, this enlarged manufacturing establishment incorporates latest advancements in production equipment to assure greater output and the uniformly high quality for which Triangle has been famous for over 30 years.

Particularly important is the exceptional degree of uniformity in the hot-dipped galvanizing, both inside and outside, of Triangle conduit. Where conditions are *really* severe — in refineries, around industrial plants, on bridges over salt water — more and more critical users are insisting on Triangle rigid steel and thin wall conduit.

For *Extra* quality — at NO extra cost — insist on TRIANGLE!

NOW SERVES YOU Better, Faster!

If It Bears This Trade Mark ▲ *It's Made by Triangle . . .*
If It's Made by Triangle IT MUST BE RIGHT!

For latest information on deliveries, contact your nearest Triangle distributor or representative, or write

ARTERIES FOR ELECTRICAL SYSTEMS — INCORPORATED

IT MUST BE RIGHT!

TRIANGLE CONDUIT & CABLE CO., INC.
1904 JERSEY AVENUE, NEW BRUNSWICK, N. J.
PLANTS: NEW BRUNSWICK, N. J. • MOUNDSVILLE, W. VA.

BUILDING WIRE • BARE WIRE • ARMORED CABLE • "GLAZON" TRIEX NON-METALLIC SHEATHED CABLE • SERVICE ENTRANCE, SERVICE DROP, VARNISHED CAMBRIC BRAIDED OR LEADED, TRIOPRENE TRENCH, POWER AND PARKWAY CABLES
RIGID CONDUIT • ELECTRIC METALLIC THIN WALL CONDUIT • FLEXIBLE STEEL CONDUIT

CON-L-DUIT
APPROVED SAFETY ENCLOSURE

SAFETY IS CHEAP! Protection from open conductor bars on cranes and monorails is now available at low cost with CON-L-DUIT, a specially compounded neoprene-base insulation. It complies with Safety Codes of all States. Two sizes to fit all new and existing figure-8 conductor bar systems. Is practical on curves, straight runs, switches, interlocks and drop sections. Easy to install, safe, fool-proof, and economical.

CON-L-DUIT is sold and serviced by electrical contractors and crane equipment dealers everywhere. Write for illustrated literature.

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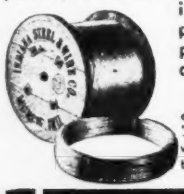
STEEL STRAND
Crapo GALVANIZED PRODUCTS

ALL the strength and durability inherent in steel are combined---with definite economies---in Crapo Galvanized Steel Strand. Heavy, ductile, tightly-bonded zinc coatings, applied by the famous Crapo Galvanizing Process, provide lasting protection against corrosion.



Ask the distributor of Crapo Galvanized Products near you or write direct for further information!

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STEEL & WIRE CO.
MUNCIE, INDIANA

MOTORS, GENERATORS, TRANSFORMERS
1 — 1500 H.P.
Bought and Sold
New and Rebuilt
ELECTRIC EQUIPMENT CO.
ROCHESTER 1, N. Y.

It Pays to Advertise in Electrical West

The epic story of population and industry migration Westward rivals the gold rush migrations of 1849-50. Added to the already rich and stable market afforded by the region, they make the West the nation's preeminent market for electrical equipment, materials and appliances. These are the factors that warrant special SALES and ADVERTISING attention to this market. ELECTRICAL WEST blankets the market, completely and intensively and its value as a sales builder is attested by 247 advertisers who regularly use its pages to pave the way for their salesmen.

● William J. Ashton has become an active partner in the firm of Omer Cox Co., mill selling agents, San Francisco. The firm represents a number of manufacturers of electrical and hardware lines. Before taking over the operation of the Omer Cox organization, Ashton worked in San Francisco with the Pacific States Electric Co., which later became General Electric Supply Corp. From 1934 until 1948 he was connected with the lamp department of G-E in a sales capacity.

● WILLIAM E. OSBORNE, electronics engineer, has been named chief of the electronics and guidance division of Marquardt Aircraft Co. This division was recently moved to Van Nuys, Calif., at the time of the consolidation by General Tire & Rubber Co. of its two subsidiaries, Marquardt Aircraft Co. and General Tire & Rubber Co. of California.

● OWENS-CORNING FIBERGLAS Corp. has started operation at its new Santa Clara plant which has been under construction since 1948. The plant will turn out Fiberglas building and industrial insulation materials, and plans soon to be producing cold storage and aircraft insulation.

● E. C. CARRASCO has taken on duties as operations manager for W. J. Lancaster Co., northern California Motorola distributor headquartered in San Francisco. Before his new appointment Carrasco held a similar position with the Los Angeles branch of Leo J. Meyberg Co.

● ALEX KUEHLTHAU, formerly regional manager of Electromaster, and more recently executive manager of the Seattle office of Northwest Appliance Distributors, has joined Cooleator as its Northwest regional manager.

● LEE F. AUSTIN Co., Spokane, has been appointed a certified service shop for Allis-Chalmers motors, controls and transformers in several counties in Washington and Idaho. The firm is headed by Lee F. Austin. W. O. Brown is superintendent in charge of service work.

● CORY CORP. has announced the opening of a new district sales office in Dallas, headed by Harry Roehm. The office will supervise the sales of Cory products through the states of Texas, Oklahoma and New Mexico.

● LARSON DISTRIBUTING Co., Denver, has taken on distribution of the Florence range and heater lines for Colorado, southern Wyoming and western Nebraska.

● ASSOCIATED WHOLESALE ELECTRIC Co., Los Angeles, is a newly named Allis-Chalmers general machinery division dealer. In addition Baker Electric Co., Denver, has been appointed a certified service shop for Allis-Chalmers products in the state of Colorado and parts of Wyoming and Nebraska.

● CENTURY DISTRIBUTING Co., southern California distributor of Emerson radio and television, has established a San Diego branch office, headed by Bob Mosher, who formerly handled the San Diego territory out of Los Angeles.

● CHARLES J. KERRIDGE has set up his own company to handle distribution of Tele-Tone radios and television receivers in San Diego. Kerridge will also represent the products of General Air Conditioning Corp., in San Diego.

● DALCO APPLIANCE Co., San Francisco and Sacramento, has been made exclusive distributor for Florence gas and electric ranges in northern California and western Nevada. The line is displayed at the Western Merchandise Mart in San Francisco.

● CHARLES E. BARKIS and ROY R. CROOKE have taken over the management of the switchboard department of Charles A. Langlais Co. and will operate as the Western Switchboard Co., 474 Bryant St., San Francisco.

● R. E. DANIELSON has formed the Danielson Distributing Co. to handle Amana freezers and refrigerator products in the San Diego and Imperial territories.

● NEWLY named Pacific Coast dealers for Allis-Chalmers general machinery division include Fisher Bros. Co., Astoria, Ore., and May-Air, Modesto, Calif.

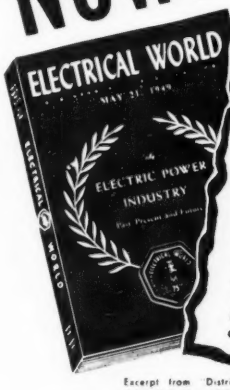
● EDWARD G. MACK has been named a district sales manager of Easy Washing Machine Co., covering the southern California territory from Santa Monica to Santa Barbara.

● FEDERAL ENTERPRISE Co., new distributor in Los Angeles, handles the Federal radio line, manufactured by Federal Telephone & Radio Corp.

● BURNHAM ADAMS, manager of the California division of Lear Inc., has been elected vice-president of the corporation.

● J. GRAYSON JONES has been appointed chief engineer of Conrac Inc., television manufacturers, Glendora.

NOW! the transformer of the future

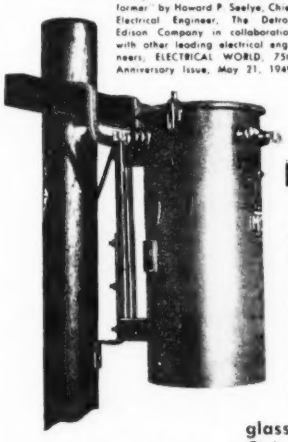


FUTURE POSSIBILITIES

. . . It is to be expected that such activity (improvements) will continue in the future. Much of it can probably not be foreseen at this time. There are a few items, however, which might be mentioned as either distinct possibilities or highly desirable.

There is considerable promise of the production of a dry-type distribution transformer for pole top installation. The advantage will be less weight and lower maintenance. It seems possible that on such a transformer the case might be reduced to a minimum or perhaps be eliminated entirely.

Excerpt from "Distribution Transformers" by Howard P. Seelye, Chief Electrical Engineer, The Detroit Edison Company in collaboration with other leading electrical engineers, ELECTRICAL WORLD, 75th Anniversary Issue, May 21, 1949



MARCUS

DRY TYPE AIR COOLED DISTRIBUTION TRANSFORMERS

Months before the publication of this excellent article on distribution transformers, Marcus, a pioneer in the field, announced a new line of *all purpose* dry type distribution transformers for indoor or outdoor service.

The complete absence of hazardous oil or toxic liquid affords safety never before realized. Superior Class B and C heatproof insulation, such as fibreglass, mica, porcelain, new Johns-Manville *Quinterra*, etc., results in overload capacities unobtainable with Class A oil filled units. The entire transformer element is seal protected against oil, acids, moisture, etc., and is housed in a sturdy, scientifically ventilated, weather proof case which conforms with all applicable EEI-NEMA construction standards. This extremely versatile transformer can be used outdoors, pole or platform mounted or indoors at the load center, mounted wherever convenient with no expensive fireproof vault required.

Currently available in sizes to 100 KVA, voltages to 5000 V.

AIR-COOLED TRANSFORMERS EXCLUSIVELY
1 to 2,000 KVA up to 15,000 Volts to meet Individual Requirements
- DISTRIBUTION
- GENERAL PURPOSE
- UNIT SUBSTATION
- PHASE CHANGING
- ELECTRIC FURNACE
- RECTIFIER
- WELDING
- MOTOR STARTING

Write for Bulletin #49-ACO

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HILLSIDE 5, NEW JERSEY

PIONEERS IN THE FIELD OF AIR-COOLED TRANSFORMERS

DOUBLE DEPENDABILITY

is the reason why more and more time switch buyers are specifying

INTER-MATIC

Dependable PRODUCT!
Dependable MANUFACTURER!

Specifications

- 35 ampere, 120 volt switch
- Self-starting, synchronous timing motor
- Manual control
- Automatic reset
- Sturdy terminal block, large terminal screws
- Combination ½" and ¾" knock-outs in back, bottom and each side
- Drawn steel case with spring hasp to keep door closed
- Entire mechanism removed by loosening one screw
- Fully guaranteed and Underwriters' Approved

Write for complete details.

International Register Co.
2624 W. Washington Blvd.
Dept. 99-H, Chicago 12, Ill.

10.95 LIST f.o.b. factory Chicago

INTER-MATIC TIME SWITCH

● PAUL H. RICE Co. San Francisco has been appointed factory representative for the Orley line of freezers and electric refrigerators, and the Automatic Washer Co. for the region covering northern California and western Nevada. The firm has also been named northern California factory representative for Electratoaster Inc., makers of a pop-up toaster.

● WITH HEADQUARTERS at the Western Merchandise Mart, Edwin P. Wegner has assumed duties as traffic appliance supervisor for the Westinghouse Electric appliance division on the Pacific Coast. Prior to his appointment Wegner served as a salesman for the M. Seller Co., and more recently was associated with the Kaemper-Barrett Co.

● THE PACIFIC PLANT of U. S. MOTORS in Los Angeles is undergoing expansion which will add 33,000 sq. ft. of space to its location at 200 E. Slauson Ave. One section already completed consists of 20,000 ft. of floor area. The second unit now under construction is being equipped with utility tunnels for air, water and power, and an automatic fire sprinkler system.

● R. H. GEMBERLING recently left the Herb E. Zorbrist Co. as its Spokane branch manager to organize his own business as a distributor for Admiral Corp. in Spokane and the Inland Empire. Gemberling has established an office and display rooms at 121 S. Monroe St.

● M. S. BANDOLI, formerly with the Bandoli-McIntyre Co., Los Angeles, before its liquidation in 1943, and since that time vice-president in charge of sales for Tracy Mfg. Co., Pittsburgh, Pa., has announced his resignation from that company. His future plans have not been announced.

● LANDERS, FRARY & CLARK has appointed Home Makers Co. of Portland to distribute Universal vacuum cleaners in that territory.

● MIDLAND IMPLEMENT Co., Billings, Mont., is a newly appointed distributor for Hamilton automatic clothes dryers, according to the Hamilton Mfg. Co.

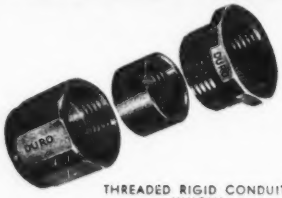
● JOE HOWE, former business manager of the International Brotherhood of Electrical Workers in Fresno, has gone into business for himself as an electrical contractor.

● APPLIANCE SUPPLY Co., formerly located at the Western Merchandise Mart, has moved to 591 6th St., San Francisco.

DURO
The All-Steel Line

EXPLOSION-PROOF UNIONS

***Precision-Made* CONDUIT FITTINGS**



THREADED RIGID CONDUIT UNIONS

CUT YOUR COSTS RIGHT DOWN THE LINE

DURO quality Fittings are competitively priced . . . and save you money on installation, replacement and maintenance. Each DURO product exceeds the minimum standard required for approval.

DURO Fittings are made to exacting standards on precision screw machines—properly gauged—full clean threads—cadmium or zinc plated.

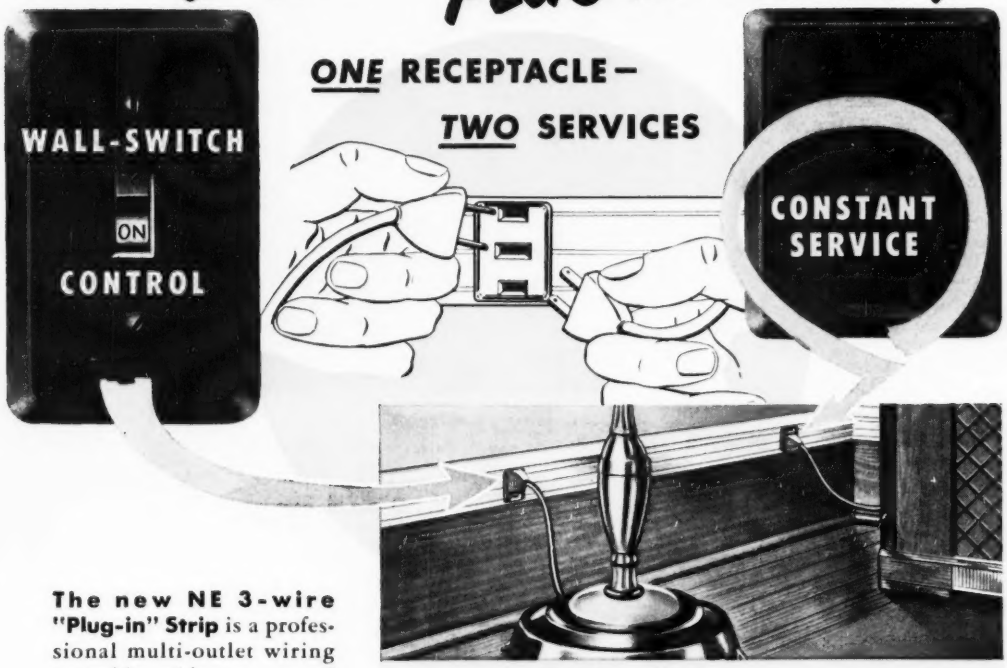
DURO offers a complete size range of EMT Fittings . . . Threaded and Threadless Unions — Adapters — Reducers — Nipples — Explosion Proof Unions — Entrance Fittings — Combination Couplings . . . Locknuts . . . Bushings . . . Flex and Cable Fittings.

DURO products are made in the West by a Leading Western Manufacturer and are distributed by qualified wholesalers throughout the West. IMMEDIATE DELIVERY—ALWAYS — ANYWHERE IN THE WEST.

Complete catalog on request.

MULTI-PRODUCTS MANUFACTURING CO.
2040 N. SANTA FE AVE. • LOS ANGELES 31, CALIF.
CONNECT WITH DURO AND YOU CONNECT WITH THE BEST

NOW- a switch controlled "PLUG-IN" STRIP!



The new NE 3-wire "Plug-in" Strip is a professional multi-outlet wiring assembly with an unusual new feature: Instead of the usual two slots, each receptacle has three.

Appliances plugged into the top and center slots are controlled by doorway switches, while appliances plugged into center and bottom slots will operate independently of the wall switches. Thus, you can turn off all lamps at once, but leave the electric clock, radio, and other appliances running.

- **EASY TO INSTALL.** At last, full switch-controlled service of *every* outlet with minimum switch-leg wiring. No complicated behind-the-wall installations.
- **ARCHITECTURALLY CORRECT.** An unnoticeable steel baseboard trim.
- **SAFE FOR LIFE.** No soldered or screwed connections . . . a solid copper electrical system from switch box to the very last outlet. Tamper-proof because the capping is locked on permanently.
- **LISTED BY UNDERWRITERS' LABORATORIES, INC.**

Let us send you a copy of our booklet "The *New* Switch-controlled 'Plug-in' Strip," and the pamphlet "An Adequate Wiring Plan for Residential Wiring Modernization."

NATIONAL ELECTRIC PRODUCTS NE WIRING SYSTEMS WIRES AND PARTS

National Electric Products Corporation

1308 CHAMBER OF COMMERCE BUILDING · PITTSBURGH 19, PA.

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PROFILES

Alden G. Roach, right above, president of Columbia Steel, and newly elected vice-presidents in charge of sales and operations: O. L. Pringle, left, and Laurence S. Dahl, center

Henry R. Huber, at right, chairman of the Puget Sound Section of IES for the term beginning in October. Before joining the Benjamin Electric Mfg. Co. as its Northwest district representative, Huber was associated with Pacific Gas and Electric Co. as a lighting representative at Fresno & Bakersfield

At San Diego Bureau of Radio & Appliance meeting, from left: Bob Jones, Ray Thomas Co.; Al Lindemann, president, L&H; C. W. Crawford, president, Ray Thomas Co.; Lou Swenson Ray Thomas Co.; Edwin Chesness, Ray Thomas Co.; John Watts, Deepfreeze

How did *you* choose? Well, here are the facts: Housewives own the most. Teachers are next; then laborers, then manufacturers. And you probably didn't guess that the wrestler owns almost as much as the corporation president.

The figures are from a study of 4300 people who invested their savings in one particular P. G. and E. stock some years ago. They are typical and illustrative rather than actual. They show that in the final analysis—all are "Capitalists"!

No *one* individual owns as much as 1% of P. G. and E. stock. Actually, we're owned by the 154,300 stockholders who've invested their savings in our company.

These invested savings, plus sound management, have enabled P. G. and E. to provide gas and electricity at rates among the lowest in the nation.

FOR THE RECORD

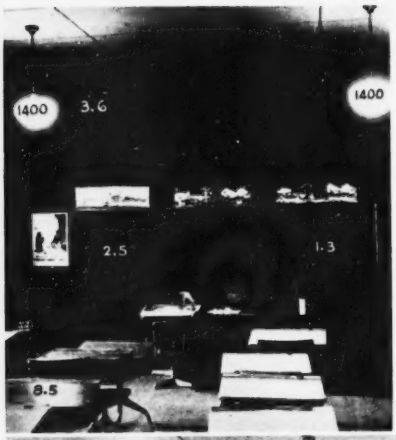
P. G. and E. stock is among the most widely held in the U. S. This is an example of why "Big Business" is *everybody's* business—teamwork between the public, management and employees.

Work Never Stops on Our Power Program

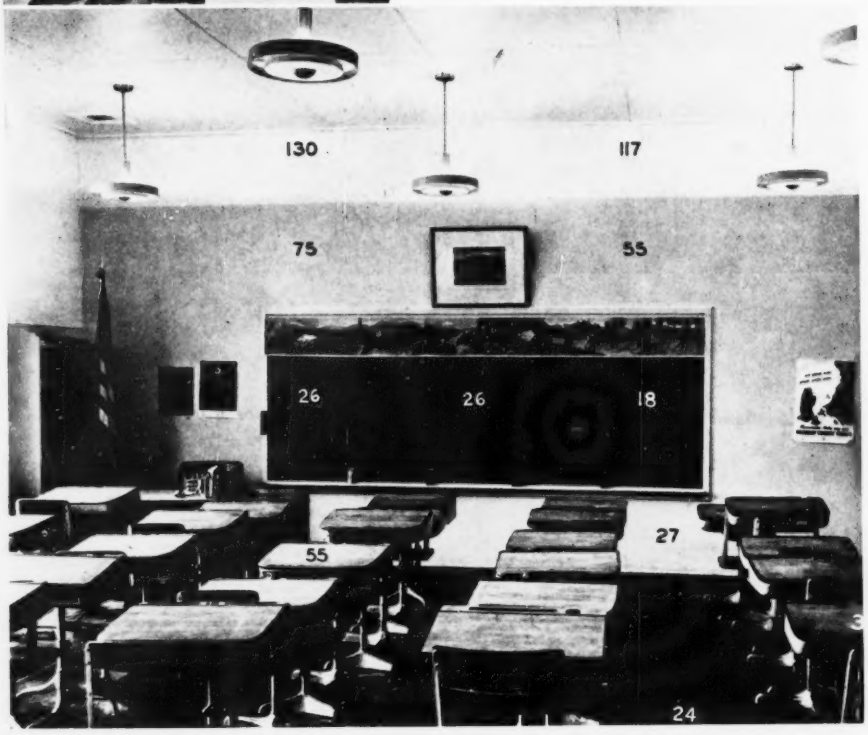
EW 109-949

Model School Room SELLS PLANNED LIGHTING

School boards and parents from four counties praise lighting job in Pioneer School near Quincy, Plumas County.



Before and After



Classroom at Quincy was transformed by . . .

- 9—500 watt incandescent fixtures
- 2—30 watt germicidal lamps
- Rewiring of classroom
- Coral colored chalkboards
- Walls painted grey and camellia
- Light colors on floor and desk tops

The model school room above is a challenge and inspiration to local electrical contractors and the lighting industry of California. Throughout California there are hundreds of schools with inadequate illumination, dingy color schemes and poor control of light and other faults that are harmful to the eyes and therefore retard classroom efficiency. Why not start a model school-lighting project in your community? It will bring you good will, prestige and profit.

PACIFIC COAST ELECTRICAL ASSOCIATION
447 Sutter Street, San Francisco 8 • 601 West Fifth Street, Los Angeles 13